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Construction of MALL Vocabulary Acquisition Model from the Perspective of Deep Learning

Jingshu Guo
Graduate School of Integrated Sciences for Global Society, Kyushu University, Fukuoka, Japan
surehyde@126.com

ABSTRACT

Mobile-assisted language learning (MALL), as an important part of mobile learning, is gradually attracting the attention of scholars. Mobile-assisted language learning is gradually replacing traditional Computer Assisted Language Learning as the dominant approach to Distance Education. The teaching of English vocabulary, as the foundation of language teaching, is often neglected in English teaching, and teachers often leave students to learn words on their own, and students also lack the corresponding theoretical basis and learning mode. Although mobile learning is convenient, its fragmented characteristics lead learners to learn only at a superficial level, and deep learning is difficult to reach. Therefore, this thesis argues that a teaching model specifically designed for deep acquisition of English vocabulary should be designed to provide a channel for learners to acquire vocabulary knowledge at a deep level. Therefore, this thesis designs a five-step model based on deep English vocabulary learning, which corresponds to the process of deep English vocabulary acquisition: 1. Introductory Session; 2. System Construction Session; 4. Practice and Examination System Construction Session; 5. The Construction of Critical Thinking Session. These five steps correspond to the corresponding mobile applications to improve students' deep English vocabulary acquisition. Students' attitudes toward Deep Motive, Deep Strategy, Surface Motive, and Surface Strategy will be tested before the start of the course using the R-SPQ-2F Questionnaire.

Keywords: MALL, mobile learning, English Vocabulary Acquisition, e-learning, teaching pedagogy

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1. Introduction

Mobile assisted language learning (MALL) is a fast-growing field based on high-speed mobile networks which compensate for the shortcomings of computer-assisted language learning (CALL) in terms of responsiveness and utilization of fragmented time. As a subarea of mobile learning (m-learning), it is gradually attracting the attention of scholars. The main characteristics of mobile learning are recognized as the potential for the learning process to be personalized, spontaneous, informal, and ubiquitous(Miangah & Nezarat, 2012). Mobile learning environments also enjoy being face-to-face, distant, or online; further, they may be self-paced or calendar-based(Chinnery, 2006).

In the 48th "China, Statistical Report on Internet Development Status"(2021) as of June 2020 released by the China Internet Network Information Centre on September 29, 2020, it was reported that the number of mobile phone internet users had reached 932 million. The number of people accessing the Internet from their mobile phones has also increased by 99.2%. There are also over 381 million online education users, which accounts for 40.5% of all internet users. The increasing level of information technology has brought about the development of the education industry. In the future, offline and online integration will be the main trends in the field. It is predicted that an increasing number of English learners will use mobile learning methods for their English vocabulary learning. Due to the increasing number of people who

use mobile phones and the rise of the internet, the development of various language learning tools has also increased. These tools are not only more popular among Chinese students, but they are also more widely used by other people. Such an application is popular because it is accessible, timely, interactive, personalized, fun, and easy to carry, record, and relate.

Although English vocabulary learning applications facilitate the acquisition of vocabulary quickly and easily, there are still several problems in this way, such as the inability to help learners build a systematic vocabulary cognitive system and the difficulty of using the vocabulary learned in English communication and reading and understanding literature. As a new learning method based on mobile devices, mobile learning is a trendsetter, but amid an explosion of knowledge, its effectiveness is inevitably constrained by objective conditions. On the one hand, compared to desktop PCs, the interface, speed, and capacity of mobile devices are relatively small when compared to those of desktop PCs.

On the other hand, mobile learning is limited by its characteristics and has the following limitations compared to conventional approaches to learning: 1. Mobile learning is made up of relatively independent small modules, which makes it easy for learners to learn in sections while at the same time posing a challenge to their ability to integrate and reconstruct. (Zhang & Wu, 2015) 2. Mobile learning is fragmented. This fragmentation of learning time makes it difficult to ensure deep learning, and if the information received in a short period exceeds the learner's processing capacity, information overload is likely to occur. 3. Complexity of the environment. Mobile learning is often carried out with various mobile terminals in various possible contexts with various forms of interference, so mobile learning requires a higher level of attention and self-monitoring from the learner. When interfering information replaces the real learning content, not only does the learning effect have to be greatly reduced, but the learner's psychological state is also affected. Does mobile-based English vocabulary learning also lead to fragmentation? Can mobile learning facilitate learners' systematic acquisition of English vocabulary and improve their vocabulary competence? There has been a lack of systematic research on the efficacy of deep vocabulary learning in second language acquisition and mobile learning.

2. Literature Review

2.1. Definition and Features of Mobile Assisted Language Learning

John Traxler (2005) noted that the increasing interest in mobile learning has led to academic recognition. He also discussed the various advantages of this technology. Academic conferences and international workshops on mobile learning are increasing year by year. He defines mobile learning as “any educational provision where the sole or dominant technologies are handheld or palmtop devices”. He also talks about the various kinds of devices that can be used to implement this technology. These include smartphones, tablets, and personal digital assistants (PDAs).

According to O’Malley et al., 2003, mobile learning is a type of educational technology that allows students to take advantage of the various learning opportunities that are available through mobile devices (O'Malley et al., 2005). Kukulska-Hulme (2009) and colleagues defined mobile learning as the ability of learners to access educational activities outside of their usual location. Wu Wen-Hsiung et al (2012) held the opinion that mobile learning is a type of educational technology that allows students to engage in various educational activities using their mobile devices. It can be used to communicate with others and access data. One of the most important studies conducted on the subject was by Sharples (2009), who argued that mobile learning should also be explored in terms of how it can be used to acquire knowledge

as educational technology. He defines mobile learning as "Research into mobile learning is the study of how the mobility of learners augmented by personal and public technology can contribute to the process of gaining new knowledge, skills, and experience."

The unique nature of mobile learning makes it different from traditional learning and has several features that make it unique. Kearney, Schuck, Burden, and Aubusson (2012) described three distinctive features of mobile learning: “personalization, authenticity, and collaboration". Among those three, personalization was regarded as the most important one. Personalization features are also included in mobile learning. These include the ability to customize the experience of learning and the agency of the program (McLoughlin & Lee, 2008). Authenticity it refers to the tasks in mobile learning being authentic and providing real-world relevance to the learner(Radinsky, Bouillion, Lento, & Gomez, 2001). By collaboration it refers to mobile learners by using mobile devices may connect to a wide variety of resources online and also get connect with other learners.

2.2. The Criteria for Second Language Vocabulary Acquisition

Cronbach (1942) identified a series of behavior that he regards as a symbol of understanding a word: (1) The ability to define a word, this level was indicated as a generalization. (2) The ability to recognize the illustration of a word, to select from a range of words an appropriate one. This ability was defined as application. (3) The ability to recall the meaning of a word in different contexts, and distinguish these meanings in a corresponding given context. This behavior was regarded as breadth. (4) The ability to apply the term to all possible situations including unfamiliar ones. This level was called precision. (5) The ability to use the word in discourse and thinking. The level was called availability.

Richards (1976) presents eight assumptions about the nature of second language lexical competence as followed: (1) The native speakers' vocabulary knowledge continues to expand in adulthood, as opposed to their more established syntactic skills. (2) Knowing a word means knowing the probability of encountering it in speech or print. Having a good understanding of the other words that are commonly used with the said word can also help improve the likelihood of learning it. (3) Knowing a word implies comprehending the boundaries of its use in various functions and circumstances. (4) Knowing a word means being aware of the syntactical properties of that word. (5) Understanding a word entails an understanding of the underlying morphology of the word and its derivatives. (6) Recognizing a word requires an understanding of the contextual relationship between that word and other words. (7) Understanding a word means being aware of the semantic meaning of the word. (8) Understanding the varied connotations of that word.

Laufer (1997) summarizes the six areas needed to learn new words: (1) Form: Oral (for pronunciation) and written (for spelling). (2) Word structure: the bound root morpheme or basic free morpheme, and the derivations and inflections of a word. (3) Syntactic- word pattern in sentence or phrase. (4) Meaning: the referential, affective and pragmatic meaning. (5) Lexical: synonymy, hyponymy, and antonymy. (6) Collocations.

3. The Construction of the MALL Vocabulary Acquisition Model

This paper will design the structure and process of a mobile-based model for teaching English vocabulary, taking into account the specific mobile application and the specific teaching process. (see Figure 1)

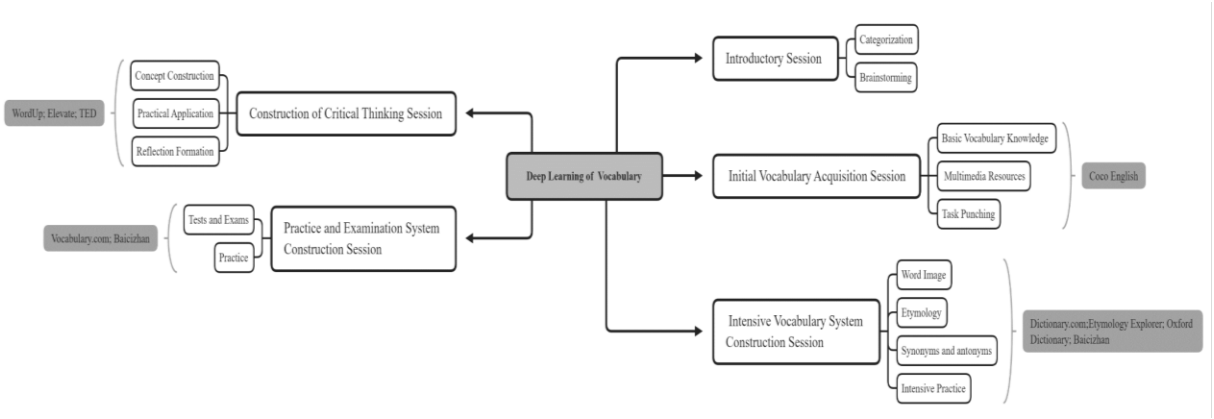

Figure 1. The Deep Learning-based MALL Vocabulary Acquisition Model

The model is based on discovering and developing students' deep learning skills and on the mobile application. This thesis divides the model into five sessions, each with stage goals and a mobile application to be used to achieve that goal. the first stage is the Introductory Session, in which the main focus is to use inspiration and categorization to divide the huge number of word lists into different types of small parts, and through categorization to initially build students' awareness of the classes of words and their thematic thinking.

The second part is Initial Vocabulary Acquisition Session, the main purpose of this part is to establish a surface learning of the basic knowledge of words through repetition and mechanical memory, this part does not require students to understand the profound connotation of vocabulary, the goal of this part is to be able to build a large input of word knowledge through continuous repetition. Only through a certain amount of input can we build a good foundation for the later sessions. This part is also very critical, and without proficiency in this part, there is no way to achieve the construction of deep learning.

The third part is the Intensive Vocabulary System Construction Session, in which the purpose is to build the knowledge framework required for deep learning, to systematically establish the internal connections among various aspects of words, and to understand the various levels of word knowledge. In the model, this thesis focuses on building word images, building word etymology, root and affix knowledge, as well as synonyms and antonyms, syntactic structures, and some supporting intensive training. The implementation of these contents requires the facilitation of some mobile applications: Dictionary.com; Etymology Explorer; Oxford Dictionary; Baicizhan, etc.

The fourth part of the model is the Practice and Examination System Construction Session. This session focuses on exams and tests to evaluate and validate the students' progress and to further strengthen their mastery of the basic content through practice. The exams and tests are also used to further identify deficiencies in learning and to correct and supplement them. In this session, we use applications that test the learning content, such as Vocabulary.com and Baicizhan, both of which have very sophisticated and rich word testing and review mechanisms, so that learners can freely choose the appropriate way to test their learning. To further lay a good foundation for the implementation of deep learning.

The last session, the fifth session, is the most important part of deep learning, the Construction of Critical Thinking session, the main goal of this session is to achieve the most important part of deep learning: building students' critical thinking skills. This part is also the core content required for deep learning, through the understanding of word extension concepts, to achieve a higher level of cognitive ability including metacognition and the ability to analyze, evaluate and create. At this stage, learning is active and self-reflective, with the ability to provide self-

reflection and self-reference. They can consciously construct what they have learned and formed a new body of knowledge. In this session, this thesis used WordUp, Elevate, and TED, mobile applications, to assist us in vocabulary acquisition.

3.1. Introductory Session

Taking the example of New College English Integrated Course 2, Unit 1 titled *Ways of learning*. The focus of this unit is on the comparison between Chinese and Western approaches to education, the teacher can categorize the vocabulary before teaching. The vocabulary related to education or ways of thinking and learning, such as elementary, exploratory, accomplish, retrospect, performance, comparable, technological, and superior could be categorized. Other categories examples can be seen in the following figure. (see Figure 2)

During this period, students' mental schemas about different concepts are activated, and throughout the period the teacher subdivides words into four groups of words with different categories and themes, such as words related to education, words related to emotion, words that represent concrete objects, and words that are descriptive. This classification enriches students' semantic knowledge and builds a mental lexicon based on the core words. According to The prototype theory (Geeraerts, 2006), there is a graded degree of attribution to a conceptual category, with some members being more central than others. Every member of the class is not equally central in human cognition. Cognitive semantics believes that lexical concepts center around one prototype through family resemblance, the extended senses of polysemes evolved from the prototypical meaning. In this way, it is possible to build the prototype of the word, as well as to construct knowledge about the prototypical meaning of vocabulary and its word groups and meaning groups.

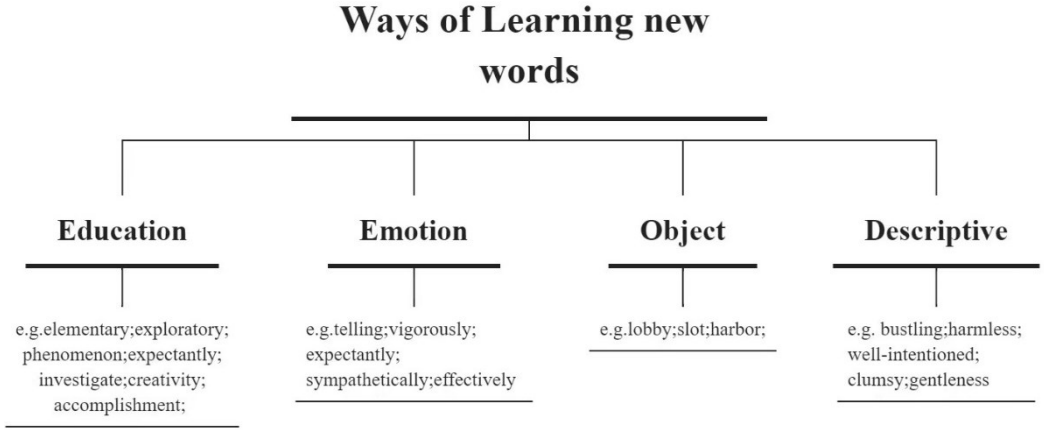

Figure 2. The New Words Classification for Introductory Session

3.2. Initial Vocabulary Acquisition Session

In this session, the word recitation tasks are combined with the appropriate mobile learning application according to the specific words in the textbook. The tasks in this stage are mainly done by students after class. The mobile device chosen for this stage is Coco English for the surface learning stage of word recitation. Teachers can create classes on the Coco English teacher version, this application allows students to join the classes managed by their teacher, and check the completion of students' tasks on the teacher's end.

As can be seen in Figure 3, the first icon is the teacher version of Coco English, the second is Coco English, and the third and fourth are the primary and secondary versions of Coco English.

Figure 3. Various Edition of Coco English

As can be seen in Figure 4, once students turn on the student version of Coco English, they can select the appropriate word bank in the application that matches their school textbook. In the first screenshot we can see that we have selected College English Integrated Course 2 as the word bank we will recite. This allows us to match the content with the textbook. In the second screenshot, we can see that the system has customized 53 learning levels for us. The learning content is named in the form of a breakout game, which can stimulate students' interest. The application also allows us to view the learning rankings and interact with other learners through word pk games. In the third screenshot, we can see the progress of our learning, and the teacher can check the students' learning regularly through the Teacher version. In the fourth screenshot, we can see the word learning procedure. Coco English will first provide a word-specific interface for students to recite words, where the basic content includes the pronunciation of the word, example sentences, and videos of the word appearing in movies and songs. In the extended content interface, there are word derivations, word roots and affixes, word analysis, phrases, and English interpretations from Collins' dictionary. There are even related mnemonics to help students remember. The application integrates and regroups the entire unit of 88 words and 11 phrases, and we can see that the system develops a task schedule for the learner of one level per day, each level containing 15 words or phrases. This allows the heavy word memorization task to be subdivided into each day's learning content, with each day requiring only 20 minutes to half an hour to complete the day's task. The entire unit of words and phrases can also be learned in just 7 days. Breaking down the learning tasks and reducing the burden on students, also allows students to make full use of their fragmented time so that they can complete their vocabulary learning after school.

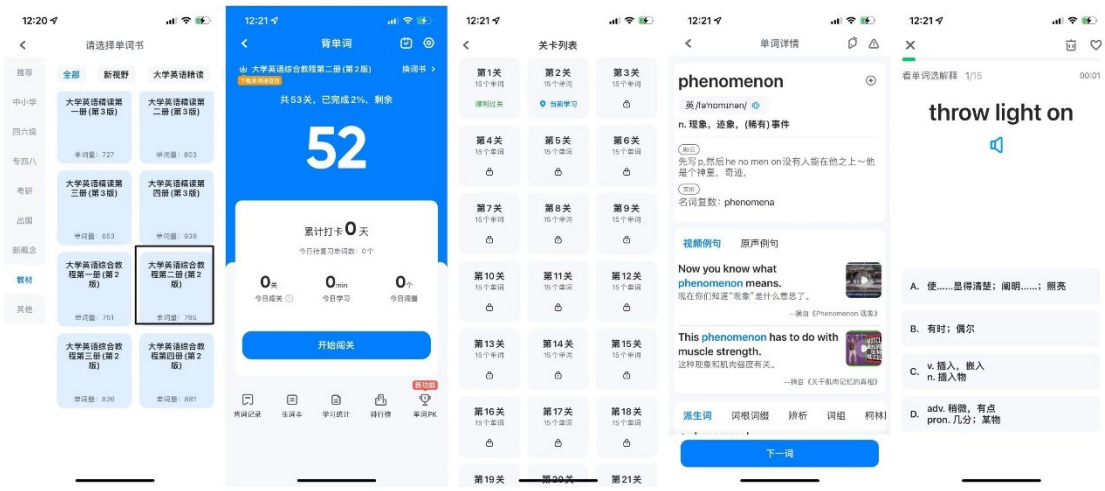

Figure 4. Setting and Learning New word at Coco English Student Version

3.3. Intensive Vocabulary System Construction Session

This session is the third stage of deep learning-based vocabulary mobile learning. The main purpose of this phase is to further summarize and summarize the semantic knowledge, etymological knowledge, and morphological knowledge of words after the previous phase of vocabulary learning. The first mobile application chosen for this session is Baicizhan, one of the most popular vocabulary applications in China. The other two applications are two vocabulary applications with high download counts in the worldwide application market: Dictionary.com: English Words and Etymology Explorer. Another selection is an authoritative online dictionary: the Oxford Dictionary of English. (See Figure 5)

Figure 5. Application for Intensive Vocabulary System Construction

The most distinctive feature of Baicizhan is the "word image" part of the application. In this module, the application designs a part of the word image to represent the meaning of the word based on the basic meaning of the target word. A special feature of Dictionary.com is that it provides a series of synonyms of a word and allows you to select any two of them for comparison. Etymology Explorer, as the name suggests, is about querying a word's knowledge of Etymology. Through the query, the etymology tree of the word, the word family, and children can be found. In this session, we select some important words, words that are difficult to recite, or words that are rich in connotation, to focus on the construction of word meaning groups. To build a complete lexical knowledge network for the keywords.

In Figure 6, we can see how the word image is used to help students remember words. First of all, the first screenshot shows a graphic image for each word. For example, in the first image, a house is drawn and the foundation part of the house is deformed from the word foundation. This kind of visual image can give learners a deeper impression than the verbal description, and whenever learners think of the word, the image will visually appear in their mind and learners can quickly recall the meaning of the word. Another example is the word pose, the word image is a girl posing in a dance pose, and the initial P of the pose changes to form the image of a girl. For the word community, the letters m and n are designed as the image of a building, and the whole word forms an image of a community. In the second screenshot, we can see that for specific words, Baicizhan has also designed illustrated example sentences: the example sentences are paired with pictures that reflect the overall meaning. The third screenshot shows the word recitation interface, which is interchangeable with Coco English. Students may choose freely either application for initial word learning according to their interests. The word recitation interface is unique in that it gives four pictures for each word and asks the learner to choose the one that matches the meaning of the word. If the word is chosen correctly, a special effect of killing the word with a knife will appear, which means "beheading" the word. This interesting format can also effectively stimulate learners' interest in learning and give them a pleasant feeling of "eliminating obstacles" at any time so that learners can enter the application and learn more actively.

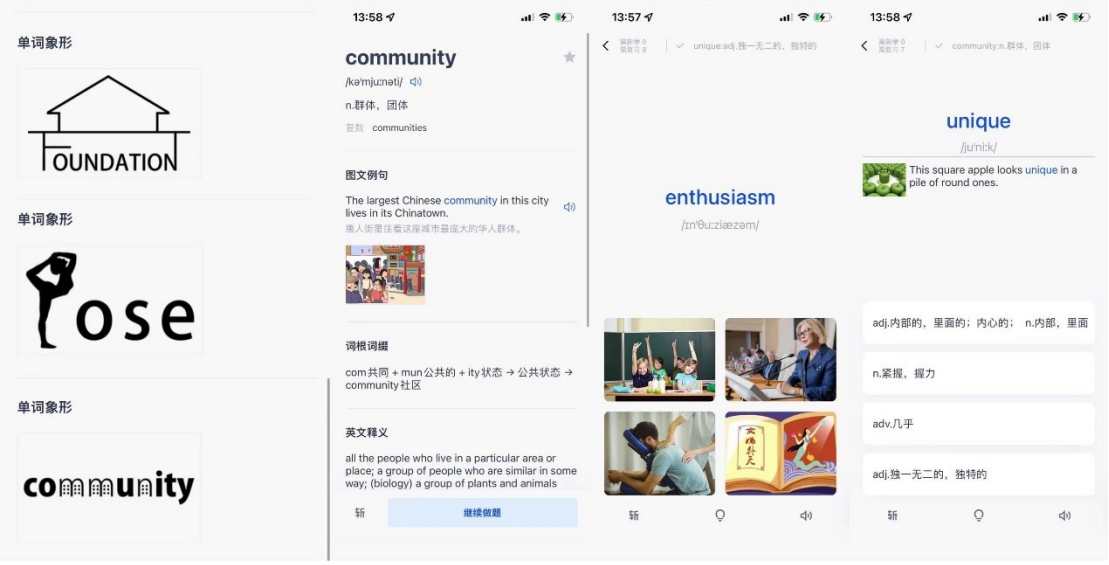

Figure 6. Word Image of Baicizhan

The Dictionary.com application allows the teacher to select some representative words to further build students' word knowledge. For example, for the word "phenomenon", we can see in the second screenshot the knowledge about the etymology and the origin of this word.

"*Origin of the phenomenon:*

First recorded in 1580–90; from Late Latin phaenomenon, from Greek phainómenon appearance, noun use of neuter of phainómenos, present participle of phaínesthai "to appear, become visible," passive of phaínein to show, bring to light, make known."

From the above explanations, English learners can better understand the etymology of an English word, so that learners in non-English environments can learn more about the formation process of the word from the perspective of cultural development. Taking the word "phenomenon" as an example, we can learn from the explanation in the application that this word comes from Latin and originally means "to appear, become visible" and "The first screenshot shows that the root word "-eons" in English means "anything that can be perceived as an occurrence or fact by the senses". It is then become easier to understand the meaning of the word phenomenon by combining the above information: " 1. a fact or situation that is observed to exist or happen, especially one whose cause or explanation is in question; 2. a remarkable person or thing." Another feature of the application is that it can build a system of word clusters and compare synonyms, as shown in the third and fourth screenshots, we can see that for the word "phenomenon", the application gives a series of synonyms, which are marked by darker and lighter icons according to their degree of relevance. The learner can select any two of them to compare. The results of the comparison are shown in screenshot 4. This novel approach makes it easier for learners to understand all the other words related to a word and enriches the mental schema of learners. (See Figure 7)

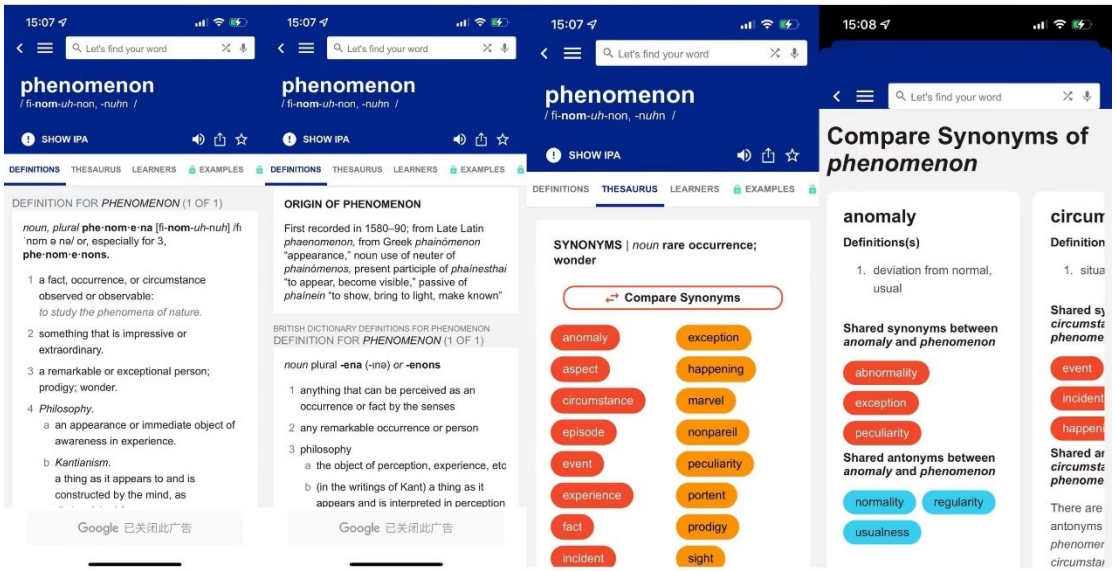

Figure7. Featured Content at Dictionary.com

3.4. Practice and Examination System Construction Session

The tests and examinations are only samples of what students know and can do, therefore the decision about which kinds of items to include on a test is a critical one(Curtis, 1987). That's the reason why it is also crucial that we choose the right application for testing and practicing for the deep acquisition of English vocabulary. The right content can create a reasonable plan for learners to test from all angles of the target word, and create a moderate and reasonable daily schedule so that learners can gradually complete their daily tasks. Staged tests and exams play a vital role in testing students' learning outcomes. If testing is always done against their learning objectives and study plan, they can effectively consolidate what they have learned and move forward to the next stage of learning. This phase of learning can be used throughout the entire period of study. It can also be used as a summary and self-assessment at the end of the previous period. The mobile learning applications used in this phase are Vocabulary.com and Baicizhan. (see Figure 8)

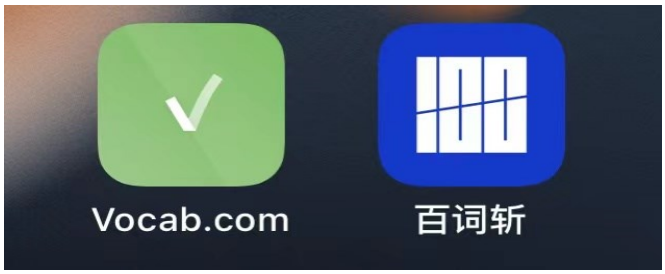

Figure 8. Application for Practice and Examination

Vocabulary.com is also a very popular English vocabulary learning app with a high number of downloads. You can easily look up the meaning of words and collect the words you look up into a customized word book. At the same time, you can also perform tests on your customized vocabulary book, manage your learning progress, track your learning, and personalize your vocabulary pushes. In this section, we will focus on its diversified testing tools. Learners can take several rounds of tests in the "Play" module to master the vocabulary.

As can be seen in Figure 9, teachers may require students to customize the words learned in this unit into an exclusive word book and, after a period of study, require the students to take a test on Vocabulary.com. Taking the word phenomenon as an example, we see the following

questions in the first round of testing for this word

"*Phenomenon means:*
○a slow longitudinal movement or deformation.
○a remarkable development.
○temporary inactivity.
○a journey to some distant place."

In this round of testing, the meaning of the target word in terms of semantic inference is examined. Usually, a word has to go through 4-6 rounds of tests with different content before the word changes from Words I've Played to Words I'm Learning and finally to Words I've Mastered. When the choice of an answer is made, the explanation of that target word is presented completely as followed:

"A phenomenon is an extraordinary occurrence or circumstance. In the 1950s, rock-n-roll was considered a new cultural phenomenon, while today we think of crop circles as a mysterious phenomenon.

Like many words with Greek roots, the phenomenon started as a scientific term, Scientists used it (and still do) to describe any event or face that could be observed, amazing or not. An earthquake, for example, was a phenomenon, because you could see it (and hear it and feel it). The phenomenon is an example of a word having a specific meaning for one group of people that gets changed when used by the general public."

The above explanation once again explains the target words from the perspective of semantic comparison, as well as from the perspective of root etymology, by way of example, giving learners effective learning materials to achieve deep learning. As another example of the word elementary in this unit, Vocabulary.com offers the following test:

"*Now Mark is in middle school, which is a separate school from the elementary school that Jack still attends.*
In this sentence, elementary means:
○local
○private
○primary
○military"

This single-choice question examines the learner's understanding of the meaning of the target word in context, knowledge of the synonyms of the target word, and knowledge of antonyms. It also examines the understanding of the meaning of the word out of context and the judgment of the application of the target word in the context. After answering the question, a further explanation of the word was provided:

"*Things that are elementary are simple or not very advanced, as in elementary school or Sherlock Holmes' famous line, "Elementary, my dear Watson!"*

Remember elementary school? That's an earlier, less advanced type of school than middle and high school. Elementary things are simpler—easy enough for a first grader to handle. A puzzle that's a snap to solve could be called elementary. We can also say that something is elementary when it's a basic building block of something else: a good breakfast is elementary to healthy nutrition, for example."

The explanations and example sentences provided by vocabulary.com are not rigidly copied from the dictionary. As can be seen from the above example, the word elementary, cites Sherlock Holmes' best-known phrase, "Elementary, my dear Watson!" so that learners can

immediately associate Sherlock Holmes' image in literature, and thus understand the meaning of elementary: the most basic, the most fundamental. The application also cites the common phrase "a good breakfast is elementary to healthy nutrition", which is a good example of the other meaning of the word "a basic building block of something else".

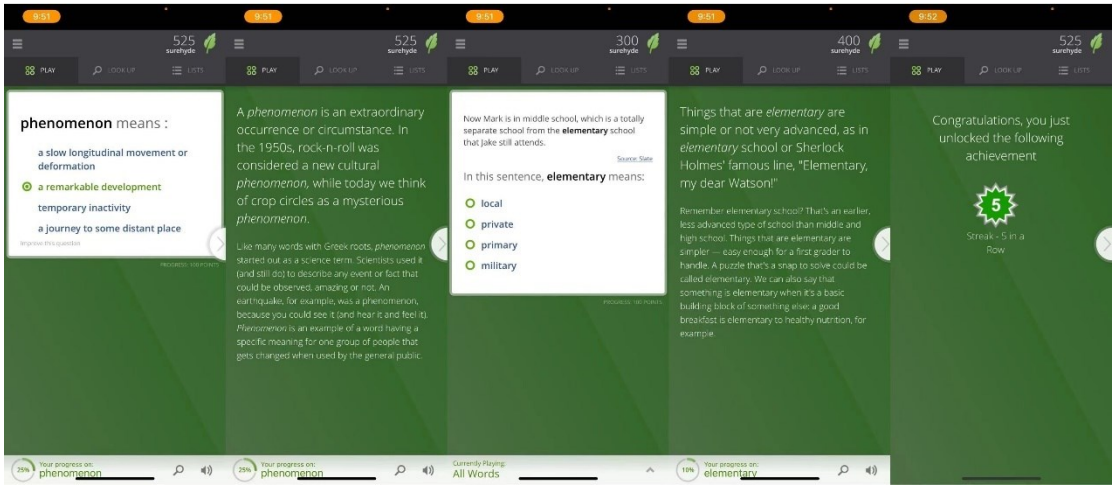

Figure 9. Test and Exams at Vocabulary.com

3.5. The Construction of Critical Thinking Session

Surface Learning of vocabulary knowledge is achieved through recognition and practice in the first few sessions. In the previous sessions, students have mastered the basic meaning, pronunciation, and spelling of words through repeated practice, repetition, and various forms of tests and exams. By the construction of a word tree for the word development history through the knowledge of word etymology and root words, learners achieve a systematic construction of word-related knowledge. Through vocabulary games, learners' interest in learning is stimulated and students' initiative in learning words is enhanced, which is also a specific feature of deep learning realization.

In this session, the thesis will focus on developing students' ability of critical thinking, i.e., the ability to think about words from a diversified perspective. The focus is not only on the meaning of the words themselves but also on their real-life applications and their real-life use in the language environment. There will be three applications mentioned in this session: WordUp, Elevate, and TED (see Figure 10). The first application used in this section is an English application called "word Up". The application can look up any target word, and for the presentation of the target word content, it consists of the following four parts: YouTube videos, Games and challenges, Quotes and idioms, and News of the day. These four sections are presented to help learners develop critical thinking skills. The YouTube videos provide learners with videos from the most popular channels to activate the learner’s interests, and the News of the day conned the learner between the target world and the general knowledge of what's happening around the world. Quotes and idioms collected the motivational and empowering exact written words that inspire the learners from favorite figures. The second application used in this session is Elevate, which aims at brain training. This application is designed to elevate the learners' critical thinking capacity from all angles like writing, speaking, reading, math, memory, etc. The last application used in this session is the famous TED, also known as TED talk or TED conference, TED is the abbreviation for Technology, Entertainment, Design. It is an American-Canadian media Technology, Entertainment, Design, is an American-Canadian media organization that posts talks online for free distribution under the slogan "ideas worth spreading". This application is dedicated to sharing influential and valuable talks on scientific,

cultural, political, humanitarian, and academic topics around the world, providing new and valuable perspectives on the discipline of learning. This application is a great reference for the implementation of critical thinking in deep learning.

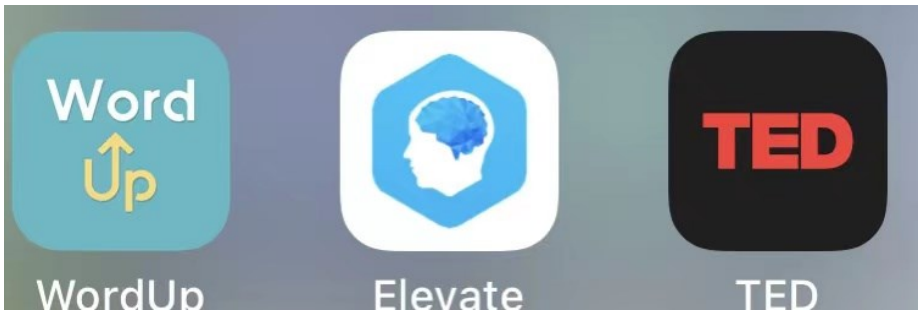

Figure 10. Applications for Critical Thinking

Inspire Critical Thinking in Vocabulary: By using the first application: WordUp, we can develop learners' critical thinking skills from the perspective of very specific words. The application can look up specific words and provide multidimensional YouTube videos, quotes, news knowledge, etc. in the presentation of each word content. The application can also be customized to fit the learner's interests, content, and learning abilities. Figure 10 shows that the application allows you to choose your study level and customize the content with quotes from your favorite celebrities, such as scientists, politicians, economists, etc. The fourth and fifth screenshots show that the application also allows you to choose your favorite topics and select the content of the exam you want to take. Finally, the sixth screenshot shows that the software has created a customized Knowledge Map containing 5,000 words, with small green squares for Known words, blue squares for To Learn, and orange squares for Current words. When all the gray squares are filled, it is the time when all the words are mastered. This Knowledge Map is an excellent visual schema from which one can know one's learning progress, which is very beneficial for learners to build their knowledge system.

From the first screenshot in Figure 11, we can see the main interface of TED, in the second screenshot we can see various channels of TED categories, these channels involve work life, health, business, design, and so on, and learners can choose their interesting content to watch. Meanwhile, in the third screenshot, learners can see that the application provides several popular topics for learners to choose from. Since the topic of our sample lesson is "education", we chose the category "education" to correspond with it. In this section we can find many presentations on education: including a comparison of Chinese and Western educational methods, thoughts on online education under the Covid-19 epidemic, gender equality issues in education, and other popular topics. In a sample lesson, teachers can choose the lecture content that matches the teaching topic. Download the videos and show them to students in class or arrange for students to watch them on their outside of class. With this approach, we will encourage students to form their own opinions and views while watching others' presentations. In the final session of classroom summary and discussion, the students will present their thoughts and opinions on the topic about the views of others. This is a great way to further deepen the learning process.

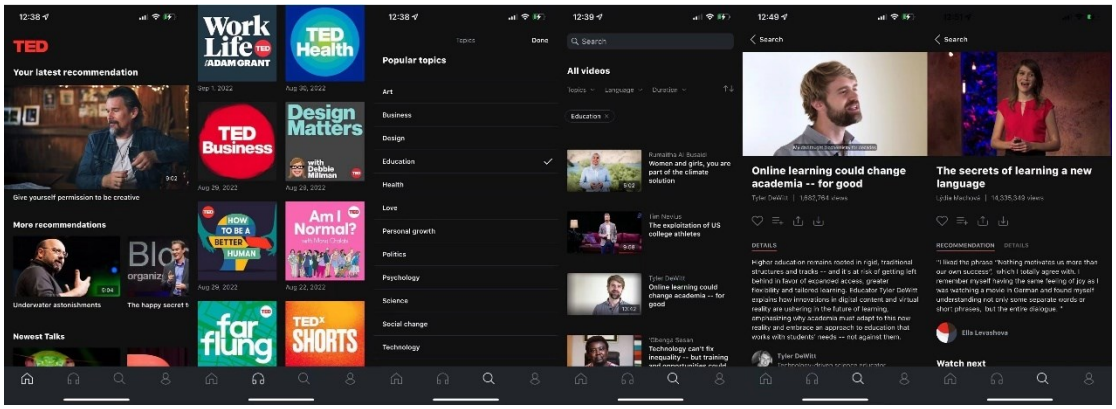

Figure 11. Speeches to Inspire Critical Thinking on TED

4. Methodology

4.1. Participant

This study selected 102 third-year university students from a top Chinese university to take this test, and this group of students came from two different classes. The students in these two classes will be trained in an IELTS performance improvement course over a semester. In this IELTS course, the instructor will teach students about IELTS listening, speaking, reading, writing, and vocabulary. In this study, in the vocabulary instruction section of this course, the instructor will use the model provided in this thesis to conduct vocabulary teaching. In each of the five sections of the model, different mobile learning applications will be used to correspond to the different vocabulary learning sessions.

4.2. Instrument

The R-SPQ-2F (Revised-Study Process Questionnaire-Two Factor) questionnaire developed by J. Biggs, Kember, and Leung (2001), was used to test students' learning styles. The R-SPQ-2F questionnaire was developed from Biggs' Study Process Questionnaire, which consists of 42 5-point Richter scale questions that test which of the following three levels of learning styles a student belongs to Deep, Surface, or Achieving (J. B. Biggs, 1987). In 2007, Biggs developed a refined version of the R-SPQ-2F, which divided the questionnaire into two dimensions: Deep Approach and Surface Approach, with each dimension subdivided into two levels: Motive and Strategy. In total, students will be measured on two dimensions which are four levels. Determine at what level the student's learning approaches are. The implication of these four levels can be seen in Table1.

Table 1.
The R-SPQ-2F Questionnaire: 4 dimensions (J. Biggs et al., 2001)

Deep Approach	Surface Approach
Deep Motive: intrinsic interest	Surface Motive: fear of failure
Deep Strategy: maximize meaning	Surface Strategy: narrow target, rote learning

4.3. Procedures

In this study, students' attitudes toward Deep Motive, Deep Strategy, Surface Motive, and Surface Strategy will be tested before the start of the course using the R-SPQ-2F Questionnaire, labeled R-SPQ-2F Pre. Again, after a phase of deep learning-based English vocabulary mobile learning training, students' attitudes will be tested and labeled R-SPQ-2F Post. The data from

the two tests were compared to examine whether the students' deep learning strategies and motives could be improved after training under the MALL Vocabulary Acquisition Model.

5. Result and Conclusions

From Figures 12 and 13, it can be seen that the paired t-test was used to study the variability of the experimental data, and from the above table, it can be seen that a total of 2 groups of paired data will show variability ($p<0.05$). Specific analysis shows that.

Deep Approach Post and Deep Approach Pro showed a 0.01 level of significance between them ($t=5.104$, $p=0.000$), as well as a specific comparison difference that shows that the mean value of Deep Approach Post (34.75), would be significantly higher than the mean value of Deep Approach Pro (32.11). Surface Approach Post and Surface Approach Pro show a 0.05 level of significance ($t=-2.651$, $p=0.011$), as well as a specific comparison difference that shows that the mean of Surface Approach Post (27.04), will be significantly lower than the mean of Surface Approach Pro (29.34). In total, all of the 2 sets of paired data will show a significant difference.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Deep Approach Post	34.7547	53	4.83539	.66419
	Deep Approach Pre	32.1132	53	5.66928	.77874
Pair 2	Surface Approach Post	27.0377	53	5.77449	.79319
	Surface Approach Pre	29.3396	53	5.99340	.82326

Figure 12. Paired Samples Statistics of Pre and Post-test

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Deep Approach Post - Deep Approach Pre	2.64151	3.76775	.51754	1.60299	3.68003	5.104	52	<.001
Pair 2	Surface Approach Post - Surface Approach Pre	-2.30189	6.32025	.86815	-4.04396	-.55981	-2.651	52	.011

Figure 13. Paired Samples Test

The students' Deep approach has been noticeably improved after a period of training. Students were more willing to take Deep Approach to learn English, and their understanding and acceptance of the Deep Approach were higher. At the same time, students' Surface Approach decreased to a certain extent, and students began to give up some rote learning methods to learn English words but turned to some deeper ways of thinking to learn English words. In conclusion, the MALL vocabulary acquisition model based on the development of students' deep approach can change students' learning attitudes to a certain extent and make students' learning style change from surface to deep learning.

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