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The Effect of Mobile Multimodal Learning Applications on Chinese EFL Students' Vocabulary Learning

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Abstract:

This research aimed to explore the effect of using a mobile learning application on students' vocabulary learning at Xi'an Fanyi University, China. A quasi-experimental research design was used for this study. The sample consisted of 68 students majored in translation at Xi'an Fanyi University. The experimental class used the Baicizhan App to learn vocabulary in an intensive reading class, while the control class uses traditional methods to learn vocabulary. Pre-test and post-test were carried out for both classes, and the target vocabulary (vocabulary for TEM 4--Test for English Major band (4) was tested, and a questionnaire survey was conducted on 95 students from the second-year students in the University. The results from the T-test indicate that the post-test scores of the experimental class are significantly higher than those of the control class, which shows that learning with the Baicizhan App is more effective for Chinese EFL students' vocabulary learning. However, the results from the questionnaire survey showed that 95.1% of the students believed that mobile learning apps are helpful for vocabulary learning, while 4.9% of the respondents thought that they were unhelpful. Chi-square test supports that there was extremely statistical significance between the two groups (P < 0.01). Therefore, Chinese EFL students commonly believe that mobile learning apps are helpful for vocabulary learning. The results support the use of mobile learning applications in learning language in general and vocabulary for specific. Further research should be undertaken to investigate and evaluate the effectiveness of using mLearning based on demographic variables and other factors.

Keywords: multimodal learning, Baicizhan learning app, vocabulary learning.

移动多模式学习应用对中国英语学生词汇学习的影响

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摘要：

本研究旨在探讨使用移动学习应用程序对中国西安范大学学生词汇学习的影响。本研究采用准实验研究设计。样本由68名西安泛译学院翻译专业的学生组成。实验班在精读课上使用百词斩应用程序学习词汇，对照班则采用传统方式学习词汇。对两个班进行前测和后测，测试目标词汇（专业英语四级词汇——英语专业四级测试），并对大二95名学生进行问卷调查吨检验结果表明，实验班的后测成绩明显高于控制班，说明百词斩应用程序对中国英语学生的词汇学习更有效然而，问卷调查结果显示，95.1%的学生认为移动学习应用程序对词汇学习有帮助，4.9%的受访者认为没有帮助。两组间差异显着（P ＜ 0.01）。因此，中国英语学生普遍认为移动学习应用程序有助于词汇学习。结果支持使用移动学习学习一般语言和特定词汇的应用。应开展进一步研究，以调查和评估基于人口变量和其他因素使用移动学习的有效性。

关键词：多模态学习、百词斩学习应用程序、词汇学习。

1. Introduction

As a basic element of language learning, vocabulary plays a crucial role in Chinese EFL students' language learning. The mastery of vocabulary is of great importance to the improvement of students' comprehensive abilities of listening, speaking, reading, writing and translation as well as their English scores. As the English linguist Wilkins (1974) said: "Without grammar very little can be conveyed; without vocabulary nothing can be conveyed." Nation (2003) argued that English is a common language in the world. Just like brick building, English vocabulary learning is the cornerstone of English sentences and is an essential link in the process of English learning. There is no doubt that vocabulary learning has become a priority for Chinese EFL students, which is also the most time-consuming and energy-consuming activity in English learning.

Chinese college students are relatively weak in English vocabulary learning and acquisition compared with grammar learning. In college students' daily English learning, the most common problem is that they have relatively little vocabulary accumulation and they do not have a solid foundation of it. They often feel familiar with a word when they see it, but cannot give the exact meaning or explanation, or the usage of the word (Wu, 2017). That is mainly because vocabulary has not been explained explicitly by teachers and understood clearly by students, and students cannot use them properly, which indicates that the method of vocabulary learning must be improved.

O'Toole (1994) believed that the function of language as a social symbol is extended to other symbols, and these symbols are independent and interactive sources of meaning. While analyzing the characteristics of language, the role of visual and auditory symbols such as images, colors, and sounds in the discourse is emphasized. In this way, multimodal is a best suited for vocabulary learning. Multimodality is a teaching mode based on social semiotics and systemic-functional linguistics, with characteristics of presenting different methods of teaching, namely, through pictures, videos, audios and charts, etc. With such presenting methods, the students' interest in and enthusiasm for the study were raised so that their vocabulary learning ability improved (Hu, 2019).

With the rapid development of electronic science and technology, more and more mobile learning apps emerged, supplying abundant learning resources. Compared with traditional paper materials, mobile learning apps on smartphones provide virtual simulation learning situations and other electronic technologies for Chinese EFL students. It is a learning method that perfectly combines the characteristics of multimodal with vocabulary learning. Learners can choose a learning app suitable for themselves according to their own learning goals, needs, and habits and gradually transform vocabulary learning from learning in class to learning after class (Zhang, 2018). The mobile app Baicizhan chosen in this study as an example is one of the most popular vocabulary learning apps in China, and its design is a mapping of all modes in multimodality. When learners enter the interface of the Baicizhan learning app for the first time, their tactile system mode is driven, then the learning begins accompanied by the standard pronunciation of the words, examples, and the corresponding interpretation and picture of each word. In the process of reading examples, the audio will be provided by the system in situations such as exclamation, surprise, fear, or helplessness. The whole learning process is the combination of various modes and learners' consciousness and initiative in learning are fully mobilized. Zhou et al. (2019) proposed that learners can make full use of their spare time in the process of learning, which promotes the autonomy of English learning and, to a certain extent, promotes the transformation and development of teachers' teaching ideas and teaching methods.

To promote Chinese EFL students' vocabulary learning, the traditional way of teaching appears to be of little use, and the newly developed mobile learning apps with situational contexts and kinds of different presenting and explanation methods are of great help. Word pictures and video and audio explanations of

vocabulary are the most vivid ways of learning vocabulary, which can help Chinese EFL students raise their interest in learning, improve their way of learning, and promote their vocabulary learning efficiency.

2. Literature Review

2.1. Multimodality

Barthes (1997) was the first to research multimodal theory and defined *multimodality* as the integrated application of visual images in language communication and information processing and reception. Kress and van Leeuwen (2001) studied multimodality and pointed out that the learning effect can be enhanced by cooperating with various senses through different channels. Baldry and Thibault (2006) believed that the essence of multimodal is the medium and channel of language, image, text, color, music and other symbols to communicate. Multimodality also includes image, sound and other modes. Researchers synthesize their various senses (such as auditory sense, visual sense, tactile sense, and even taste) and integrate information from the outside world (including nature, society, scientific field, and other contents) to absorb, identify, interact, and then transform it into learners' knowledge (Hu, 2019). In a word, multimodality is the result of the comprehensive use and interaction of human perception in the process of receiving and communicating with external information.

Research on the application of multimodal theory in learning usually focuses on the effects of multimodal on teaching and learning. Ren (2018) studied the effects of multimodal language input mode on high school students' English vocabulary learning and found that vocabulary teaching mode of multimodal language input can improve the interest and motivation of high school students in vocabulary learning and deepen their understanding and memory of vocabulary. Zheng and Xu (2020) researched the influence of multimodal presentation on English vocabulary learning anxiety and found that multimodal vocabulary presentation, especially "text + speech" and "text + picture + speech," can effectively relieve the overall anxiety and communication anxiety of non-English major postgraduates in vocabulary learning. Xu (2021) made a study on college students' English vocabulary learning from a multimodal perspective by using a case study of Cidaren App. By analyzing the mobile app in a multimodal way, the author gave suggestions on the design of the relevant learning app. Chen (2020) conducted an empirical study on the effects of multimodal narrative teaching on high school students' vocabulary learning, and concluded that multimodal narrative vocabulary teaching not only makes the original boring vocabulary teaching more active, but also helps students to preview the learned vocabulary and promote their understanding and application of vocabulary, to improve the effect of students' vocabulary learning.

From the studies on multimodality, we found that multimodality is helpful for developing students' overall perception system (auditory sense, visual sense, tactile sense, and sense of taste) and during learning, multimodality can make full use of each mode to assist students' learning to raise students' interests of learning and attract their attention on learning. And the use of multimodal in vocabulary learning is beneficial for students' memory of words and increasing their learning efficiency. It has become a trend in China that vocabulary teaching combines traditional teaching methods with mobile learning applications to enhance the teaching effectiveness and students' learning effect. During the implementation of mobile learning applications in class, teaching methods should be paid attention to because the use of mobile learning app in class is seldom stressed by the previous studies, but only the effect of using it. So in the study, review and preview parts of mobile learning applications are used to test the effect of vocabulary learning.

The review of the current theoretical research on multimodal in China shows that although the application of multimodal in China has a short history and related research is still in its infancy, researchers have fully realized the research value and practical significance of multimodality. The research field covers not only traditional texts but also the two-dimensional plane of images and texts, hypertext electronic discourse, film and television works, the construction of multimodal spoken language corpus, and foreign language teaching practice and application. These studies are of great value and significance for promoting the in-depth development of Chinese linguistics.

2.2. Vocabulary Learning App

With the development of computer-assisted technology and the change in teaching concept, more and more researchers have studied the application of mobile apps in vocabulary learning. Wu (2017) researched the application of the Baicizhan App in vocabulary learning for high school students, and concluded that the Baicizhan App has a significant effect on students' cognitive strategies and social affective strategies. And it can help students learn vocabulary, enhance their interest in vocabulary learning and improve their autonomy and creativity in vocabulary learning. Li and Chen (2017) conducted a survey on the use of a mobile English vocabulary learning app for non-English majors, and they pointed out that most participants were willing to use the mobile English vocabulary learning app to learn vocabulary and believed that they can learn English better by using the vocabulary app. Cui (2018) conducted an empirical study on the effect of a mobile vocabulary learning app on English vocabulary learning, and questionnaire survey and experiment were used to study students' English vocabulary learning through the mobile App. He concluded that the application of a mobile learning app can optimize the effect of English vocabulary learning and improve students' vocabulary level to a

large extent. Lu and Zhou (2018) researched the application of a mobile learning app in English vocabulary teaching. Starting from the problems in junior high school English vocabulary teaching, the paper explored the application of a mobile learning app in English vocabulary teaching by taking the applications of "box fish" and "homework together" as examples. The results showed that students' learning efficiency has been improved, the roles of teachers and students have been changed, and students' learning autonomy has been promoted. Lu and Zhou (2018) researched the practicability of an English vocabulary learning app by using a case study of Hujiang Fun Word Games. Taking 53 freshmen, sophomores, and juniors majoring in business English from Wuhan Business College as objects, the paper analyzed the functional requirements and the feedback of college students on using the app to recite words from the multimodal perspective. By comparing the ability of memorizing English words using traditional way and Hujiang Fun Word Games, the paper expounded the comprehensive effect of the two methods on second language acquisition, and found that during the process of vocabulary learning, students should not only rely on memory or imitation but also try to grasp the cognitive motivation behind the words and pay attention to the internal relationship between their components and the overall meaning. Wang (2021) studied the influence of English vocabulary learning app on self-learning mechanism of college students in China and found that proper use of vocabulary learning apps can improve the efficiency of English learning.

Although some scholars in China have carried out relevant research and theoretical analysis on mobile learning app, there are still few relevant studies on how mobile learning app affects learners from the perspective of multimode. They have not further discussed the specific aspects of the app application effect, nor have they further explored the reasonableness and deficiency of the app in applying it with a combination of theories. The study uses multimodal theory to investigate the effect of a mobile learning app on Chinese college students' vocabulary learning and to determine the effectiveness of using different modes to enhance students' vocabulary learning.

3. Research Methods

To explore the Chinese students' vocabulary learning effect based on mobile app, questionnaire and experiment are used.

3.1. Participants

The research is carried out into two parts, a questionnaire and an experiment. 95 sophomore students majored in Translation in Xi'an Fanyi University took part in the questionnaire. All the participants had intensive reading class in their second year of study, and the experiment was taken during intensive reading class because one of the teaching points of intensive reading classes was vocabulary learning. 68 students whose English vocabulary is of the same level took part in the experiment, out of which 32 students were in the experimental class and 36 students were in the control class. The students chosen for the experiment took a pre-test at the beginning of the semester to ensure the authenticity of the experiment. The average score of the experimental class was 36.545, while the average score of the control class was 37.692, with a total score of 60. The pre-test results show that the students in the experimental and control classes are at the similar English level. Therefore, 32 students are in the experimental class with the mobile app learning method, and 36 students are in the control class with the traditional learning method.

3.2. Instruments

The instrument for the study is a questionnaire and vocabulary test. The vocabulary test for pre-test and post-test contains two parts, one is about language usage, which is to check students' vocabulary applications (There are twenty sentences in this section. Beneath each sentence there are four words or phrases marked A, B, C, and D. Choose one word or phrases that best completes the sentence.), and another is cloze, which is to check students' vocabulary accuracy (Decide which of the words given in the box below would complete the passage if inserted in the corresponding ten blanks). The purpose of the pre-test is to determine whether the students' vocabulary levels in the experimental and control classes are the same, and the purpose of the post-test is to examine the effect of students' use of the mobile app to learn vocabulary.

The questionnaire is conducted before the vocabulary test and the aim of it is to have a brief understanding of students' attitudes and the effects on mobile vocabulary learning. All the second year students must take part in this survey, and the questionnaire contains the following three parts:

1) The basic information of the participants (three questions);

2) The basic attitudes toward mobile based vocabulary learning (two questions);

3) The effects of mobile vocabulary learning on the participants (five questions).

The questions were presented with multiple choice, and the students were required to answer all the 10 questions in the sheet.

3.3. Procedure

The research on the effect of Chinese EFL students' mobile vocabulary learning was carried out in an intensive reading class, and the Baicizhan App, which is a good combination of multimodal, is used for the experiment class to learn vocabulary.

3.3.1. The Experiment

For the experiment, 68 students are needed, among

which 32 students are in the experimental class and 36 students are in the control class. The intensive class is chosen for the implement of the experiment because in this class, vocabulary learning is a teaching point and students must master a certain number of words each semester to pass the final exam. The experiment is divided into two parts, pre-test and post-test. Pre-test is taken at the beginning of the semester to ensure that the two classes chosen are at the same English level, and post-test is taken after the experiment at the end of the semester. During the intensive reading class, vocabulary learning for the experiment class employs the Baicizhan App to assist the students' learning vocabulary. The review part and preview part of the App are used in class and after class for vocabulary learning, in which students should learn at least 20 min a day in class and 20 min after class for reviewing and previewing vocabulary. Teachers in class do not teach vocabulary one by one as before, but just assist students' learning by the use of the Baicizhan App, and after class, students practice by themselves with the supervision of teachers online. The app includes several modes to increase students' interest and enhance students' learning efficiency. After the students select the number of words learned each day, the vocabulary review part will begin. The words learned are accompanied with examples, pictures, pronunciations, roots and affixes, after the learning page, there is a situational context or pictures to show the application and usage of the words. If students have chosen the right picture of the words, another new word will appear, which indicates that the word has been well mastered. If not, there will be another page of explanations of the word again. The details of the preview part are shown in Figure 1.
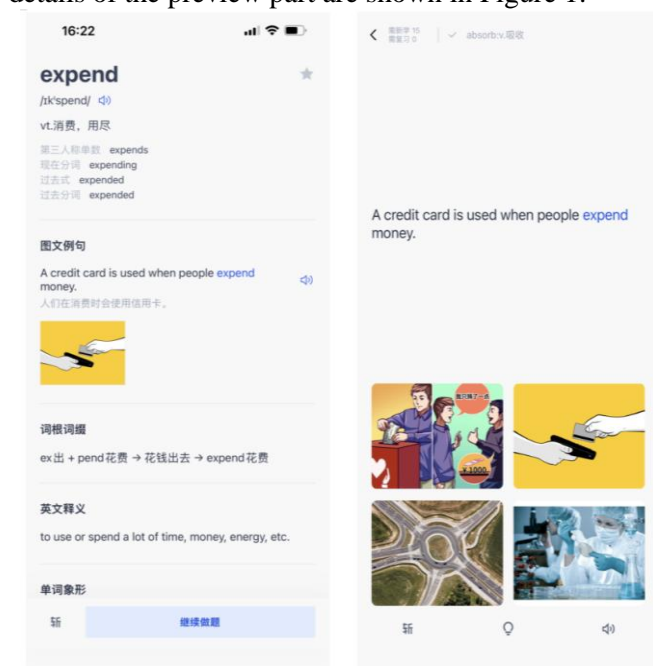

Figure 1. The procedure of preview part in the Baicizhan App

As for the review part, to stimulate students' cognition of the words learned, the corresponding pictures and the roots and affixes of the words will be given, and if students can choose the right picture, the detailed explanation of the words will be shown again to enhance the memory and application of the words. The review part of the app is shown in Figure 2.
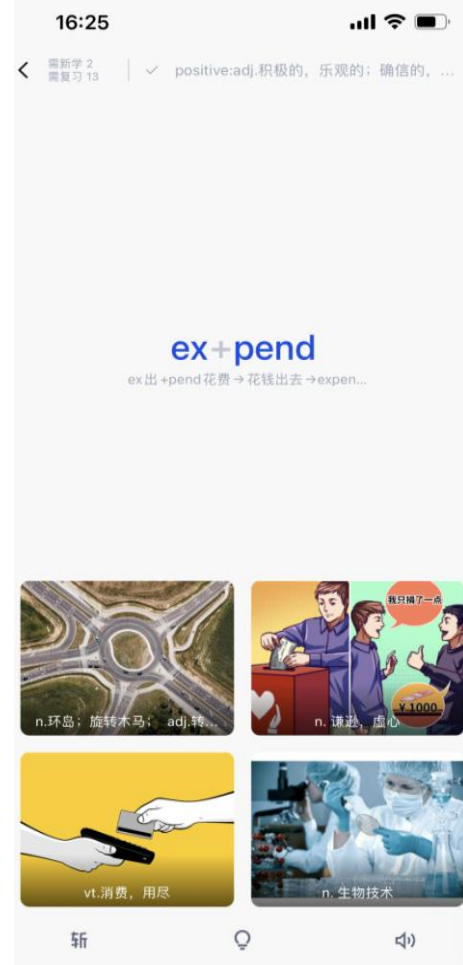

Figure 2. The review part of the word in the Baicizhan App

The app will record students' learning progress and scores of each week's vocabulary learning, and teachers can have a supervision of students' progress of learning by checking their scores and the number of words learned. Also, by checking up the words that students usually made mistakes, teachers can assist students' vocabulary learning with more specific explanations and exercises during class time.

3.3.2. The Questionnaire

For the questionnaire survey, 95 students participated in the survey. WeChat mini program A Tencent questionnaire was used to distribute and collect the questionnaire. Progress in science and technology has made the distribution and collection of questionnaire surveys more efficient, and it is more convenient for respondents to fill in online. Tencent questionnaire mini program has its own function of data analysis, which can quickly help investigators analyze data. A total number of 95 questionnaires were released, of which 95 were collected. Excluding those that took less than 60 seconds to fill in, 90 were valid, with an effective rate of 94.7%.

4. Findings

After a semester's experiment of using the Baicizhan

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App to learn vocabulary, the results of the research can be formulated from two perspectives: (1) Students' learning effect of using the Baicizhan App to learn vocabulary; (2) Students' attitudes toward using mobile learning app to learn vocabulary.

4.1. Students' Learning Effect of Using the Baicizhan App

To explore the effect of mobile vocabulary learning in the experimental class and the control class, SPSS 26.0 was used to analyze the data of students' scores in the two classes. Before the experiment, pre-test was carried out on the experimental and control classes, to ensure that there was no significant difference in the pre-test scores of the experimental and control classes.

Table 1. Comparison of pre-test result between the experimental and control classes

Class	Mean	S.D.	SE Mean	T	P
Pre-test for EC (N = 32)	36.55	6.70	1.429	-0.584	0.562
Pre-test for CC (N = 36)	37.69	6.83	1.340		

According to the independent sample T-test, the mean score in the pre-test in the experimental class was 36.545, and the mean score in the control class was 37.692. As shown in Table 1, T = -0.584, P = 0.562 > 0.05, there is no significant difference between the pre-test scores of the experiment class and the control class, which indicates that the experiment class and control class are at the same English level, and the post-test scores of the experimental class and the control class are comparable.

To test whether the scores in the experimental class has been improved compared with that in the control class after the use of the Baicizhan App, the research conducted descriptive statistics and independent sample T-test.

Table 2. Independent sample T-test for post-test results of the experimental and control classes

Class	Mean	S.D.	SE Mean	T	P
Post-test for EC (N = 32)	46.636	8.862	1.889	2.948	0.005
Post-test for CC (N = 36)	39.769	7.279	1.428		

Table 2 shows that after using the Baicizhan App to learn vocabulary, the mean score of the experiment class is 46.636, while the mean score of the control class is 39.769. The T-test result, T = 2.948, P = 0.005<0.05, indicates that the scores in the experimental class are higher than that in the control class, and there is a significant difference between the scores in experiment class and control class. So, after the application of the Baicizhan App in the experimental class, students' vocabulary learning scores have been improved, and there is a significant effect of using mobile learning applications to learn the vocabulary on Chinese EFL students.

To investigate whether there is any change in the English vocabulary level for students in the experimental class after adopting the Baicizhan App, the research conducted descriptive statistics and paired sample T-test on the pre-test and post-test test results of the experiment class.

Table 3. Independent sample T-test for the pre-test and post-test results of the experimental class

Class	Mean	S.D.	SE Mean	T	P
Pre-test for EC (N = 32)	36.545	6.703	1.429	-3.993	0.001
Post-test for EC (N = 32)	46.636	8.862	1.889		

As shown in Table 3, the mean score of the experimental class in the pre-test is 36.545, and the mean score in the post-test was 46.636, which demonstrates that the post-test score is much higher than the pre-test one. The Sig. value of paired test of English vocabulary scores is 0.001 < 0.05, which shows that there is also a significant difference in the English vocabulary learning scores of the experiment class before and after the experiment, and the average score increases by about 10 points. Then, it can be concluded that students' vocabulary learning levels greatly improved in the experimental class after the adoption of the Baicizhan App.

4.2. Students' Attitudes toward Using Mobile Learning Apps to Learn Vocabulary

To investigate college students' attitudes toward using mobile learning apps to learn vocabulary and their learning effect, all the 95 sophomore students in translation major were enrolled in the questionnaire survey. A total of 95 questionnaires were distributed through Tencent questionnaire on WeChat, 95 of which were actually collected, those whose answer time was less than 60 seconds were excluded, and 90 valid questionnaires remained. The questionnaire firstly surveyed the basic situation of the students. The 90 valid questionnaires collected show that 82 students have been exposed to the mobile learning app before, and 8 students have not. In terms of mobile learning time, 24.4% of students studied for half an hour, 35.4% for more than half an hour, and 40.2% for less than half an hour (Table 4).

Table 4. Students' basic information

	Level	Count	Ratio
Gender	Male	22	24.4%
	Female	68	75.6%
Using mobile learning	Yes	82	91.1%

apps for vocabulary learning	No	8	8.9%
Spending time every day	Less than half an hour	20	24.4%
	About half an hour	29	35.4%
	More than half an hour	33	40.2%

Regarding whether mobile learning app is helpful for students' learning, the proportion of students who think it is useful is 95.1%, and the proportion of students who think it is useless is 4.9%. After the chi-square test, the two extremely have significance (P < 0.01). It can be seen that translation majors generally believe that mobile learning apps have a positive effect on their own learning (Table 5).

Table 5. Do you think mobile learning apps are helpful for vocabulary learning?

Level	Count	%
Yes	78	95.1%
No	4	4.9%
χ^2	66.78	
P	< 0.001	

To investigate whether a mobile learning app can better motivate students to learn, 96.3% of students think they can be motivated, and 3.7% think it can't motivate them to learn. After the chi-square test, there was a great significance between the two (P < 0.01). It can be seen that English translation majors generally believe that mobile learning apps can motivate them to study (Table 6).

Table 6. Do you feel motivated and inspired to actively learn vocabulary by using mobile learning apps?

Level	Count	%
Not inspired	3	3.7%
Inspired	79	96.3%
χ^2	70.439	
P	< 0.001	

As for the detailed embodiment of mobile learning apps helping students to learn, the research investigated the following five aspects. In the investigation of whether mobile learning app has changed students' habits of learning, 80.5% of the students think that mobile learning app has changed the original learning methods, and 19.5% of the students think that it has not changed their learning methods. After the chi-square test, there was extreme significance between them (P < 0.01). Therefore, mobile learning app can change students' original learning methods.

In the survey on whether students think mobile learning apps make learning more convenient, 93.9% of students thought they made learning more convenient, while only 6.1% of students thought that they do not. After the chi-square test, there was an extreme significance between them (P < 0.01). Therefore, mobile learning apps make vocabulary learning more convenient.

Regarding whether a mobile leaning app improves students' learning efficiency, 90.2% of the respondents thought that their learning efficiency improved by using the mobile learning app, while 9.8% thought that their learning efficiency did not improve. After the chi-square test, there was an extreme significance between them (P < 0.01). Therefore, mobile learning apps can improve students' learning efficiency.

In terms of whether students are more engaging in vocabulary learning when using a mobile learning app, 90.2% of the students think that they feel more engaged in vocabulary learning with a mobile app, while 9.8% of the students think it cannot urge them to learn. After the chi-square test, there was a great significance between them (P < 0.01). It can be concluded that most students believe that mobile learning apps can urge them to learn and they feel more engaged in learning vocabulary.

Speaking of whether students' vocabulary learning skills have been improved by adopting a mobile learning app, 78.0% of the students believe that their vocabulary learning skills have been promoted, while 22.0% of the students do not believe so. After the chi-square test, there was a great significance between them (P < 0.01). It can be concluded that students' vocabulary learning skills can be promoted using a mobile learning app (Table 7).

Table 7. Independent sample t-test for comparison of primary science teachers' self-efficacy by education qualification

Item	Level	Count	Ratio	χ^2	P
Improving way of learning	Yes	66	80.5%	30.488	< 0.001
	No	16	19.5%		
Easier methods of learning vocabulary	Yes	77	93.9%	63.220	< 0.001
	No	5	6.1%		
Increased efficiency	Yes	74	90.2%	53.122	< 0.001
	No	8	9.8%		
Engaging in learning vocabulary	Yes	74	90.2%	53.122	< 0.001
	No	8	9.8%		
Improving vocabulary learning skills	Yes	64	78.0%	25.805	< 0.001
	No	18	22.0%		

To sum up, from the results of the experiment, it can be concluded that after the implementation of the Baicizhan App, students' scores in post-test are much higher than that in the control class, and the post-test scores of students in the experimental class are much higher than those in the pre-test, which indicates that by using the Baicizhan App, students' vocabulary levels can be improved and it is beneficial for students to use the Baicizhan App to learn vocabulary. According to the results of the questionnaire, students believe that the mobile learning app can help them study and they feel motivated for vocabulary learning with the aid of the

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mobile learning app. As for the detailed aspects of helping students' learning, they believe that their learning efficiency and vocabulary learning skills have been improved, and the mobile learning app has made vocabulary learning more convenient and has changed their way of learning, at the same time, they feel more engaged in vocabulary learning with the mobile app.

5. Discussion and Conclusion

Based on the analysis of the results of employing the Baicizhan App in students' vocabulary learning, it can be concluded in the following two aspects: (1) The application of the Baicizhan App improves the total score of English vocabulary in the experiment class, and there is a significant difference between the control class and the experiment class. The result shows that the application of the Baicizhan App is more effective in students' vocabulary learning compared with the traditional learning method. (2) This study also proves that the application of the mobile learning app can help students' vocabulary learning to a certain extent, and it can enhance their interest in vocabulary learning as well as improve their autonomy in vocabulary learning, during which the dominant position of students' role in class and after class can be reflected.

However, the research has its deficiency in the process of implement, for example, the objects of this experiment are limited to students of two classes in Xi'an Fanyi University, and there is no further investigation on vocabulary teaching and learning in different classes on the application of the Baicizhan App. Therefore, further studies on other students and larger studies need to be validated. Meanwhile, this research only focused on the impact of students' vocabulary learning with the Baicizhan App, but there is no further discussion on the impact of students at different English level. Therefore, further research should be carried out on the effect of mobile learning on students of different English level.

Although further research and observation of the impact of such applications on learners' performance are required before the results can be generalized, the researcher can still draw the conclusion that teachers can improve their students' vocabulary knowledge by using multimedia tools. This study investigated how students' vocabulary acquisition could be improved using Chinese language Vocabulary Mobile apps. The study's findings provide credence to the notion that using mobile applications facilitates vocabulary learning, allowing for more expansive interpretations. It can be inferred from the findings of this study that a successful method for enhancing the learning of Chinese vocabulary is based on the idea of presenting the content through pictures to demonstrate the meaning of words and aid students in remembering. The students were more motivated to study vocabulary when mobile applications were introduced because they made the definitions more meaningfully visible.

When considering the task-based method, it is feasible to conclude that engaging students in their learning process and presenting them with new vocabulary significantly increased their retention of it.

For instance, involving the students in the lesson's content by using visual aids and productive task activities helped them utilize and recall the terms chosen for this study without even realizing it.

Thus, the advantages of multimodality serve as a catalyst for changing instructors' behaviors.

It seems highly pertinent for the researchers to offer the following elements to enhance the Chinese language instruction: It would be significant to conduct the study in schools from various social backgrounds to assess whether multimodality is effective in various circumstances. This recommendation was made because the current study was conducted in two semi-public schools with comparable demographic backgrounds. Future research on this subject might find it useful to include a control group to compare the use of multimodal instruction with conventional instruction. This idea was formulated because, compared to conventional approaches, it would be clearer in illustrating the effects of multimodality.

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Authors' Contributions

All The authors were involved in conducting this research by doing literature review, designing the research, collecting, and analyzing data, and reviewing the paper as one research team.

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