



# An Empirical Study of PIAE Blended Learning in Cloud Classroom of College English Reading Course

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## Abstract

PIAE is an innovative teaching model that integrates PBL teaching model and Teaching Interaction Theory into college English reading course. This study conducted an empirical study to test the effectiveness of PIAE blended teaching based on mobile learning platform Xue Xi Tong in English reading course, and uses SPSS to analyze the datum collected from the before-test, post-test and questionnaire. Through qualitative and quantitative analysis, the research results show that PIAE blended teaching model based on Xue Xi Tong is beneficial to the improvement of English major students' reading ability and has a positive impact on the teaching effect of English reading class.

**Keywords:** *Empirical study, Cloud classroom, English reading, PIAE blending teaching model*

## 1 INTRODUCTION

Education Informatization 2.0 Action Plan (2018) points out that China should actively promote internet+ education, adhere to the core concept of the deep integration of information technology and education and teaching, and establish and improve the sustainable development mechanism of education informatization [5]. Meanwhile, with the construction of network, digital, intelligent, personalized and lifelong education system, a sound learning environment where is ready to learn, and an open, equal and sustainable education system should be built up to provide directions for better use of modern information technology in English teaching.

As an important skill training course, reading is a compulsory course for English majors. It aims to help students improve their reading speed and comprehension ability through extensive reading, so as to further expand their knowledge. With the rapid development and wide application of modern information technology and internet, teachers should make full use of information technology to carry out a comprehensive reform in order to improve the teaching and learning effect in reading course.

It is necessary and urgent to give full play to the leading role of teachers in classroom teaching, to stimulate the learners' initiative and enthusiasm in online learning, and to combine the modern information technology with classroom teaching. The combination of online and traditional offline learning is known as

blended learning. Under the background of blended learning, a large number of intelligent teaching platforms come into play. The biggest breakthrough of these platforms is the use of intelligent teaching platform to assist classroom teaching. Among these teaching platforms, Xue Xi Tong cloud classroom provides interactive functions covering all classroom teaching activities, such as class check-in, answer, selection, test, voting, multi-screen interactive discussion, class report and other functions. Because of its powerful classroom interaction function, excellent manual service and timely feedback response, it is regarded by many scholars as the first choice of hybrid teaching tools. Therefore, this paper conducts an empirical study of application of Xue Xi Tong to English reading course and studies the effect of PIAE blended learning in English reading teaching.

## 2 CONSTRUCTION OF PIAE BLENDED TEACHING MODEL

English reading is a professional core course for English majors, aiming to improve students' English reading comprehension and thinking ability, and enhance students' understanding of western culture knowledge, to lay a solid foundation for high-level English study. At the same time, students should meet the ability requirements stipulated in the National Standards for Undergraduate Teaching Quality of Foreign Language Majors in Colleges and Universities, like cross-cultural ability, critical thinking ability, innovation ability, information

technology application ability, independent learning and practice ability, then to meet the needs of the new era of compound foreign language talents [3].

Based on PBL teaching model [1] and Teaching Interaction theory [2], PIAE blended teaching model [4] is designed to solve the problems, such as the lack of interaction between online and offline teaching, students' lack of interest in reading and low reading efficiency. It is mainly divided into the following four stages.

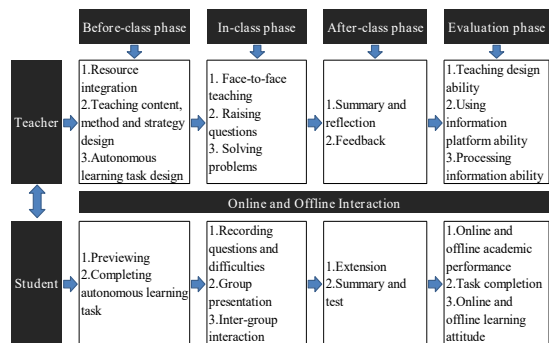


Figure 1 PIAE Blended Teaching Model

The four stages include before-class stage, in-class (face-to-face) stage, after-class stage, evaluation stage. At each stage, teachers complete teaching tasks such as creating online classes, assigning tasks, answering questions, uploading materials and courseware, evaluating and testing students, and students can complete before-class preview tasks, submitting homework, online discussion, participating in classroom activities and other learning tasks through cloud classroom. In order to solve the limitation of teacher-student interaction in offline teaching, teachers can make use of some functions of cloud classroom in class, such as preemptive answer, raise questions, interactive discussion area, and so on for interactive communication and discussion. If students encounter problems or difficulties in autonomous learning, they can have instant interactive discussions with teachers or classmates through cloud classroom. Evaluation runs through every link of teaching, in which both teachers and students are the subjects of evaluation, and the evaluation process is two-way communication. On the one hand, teachers can evaluate students' online and offline learning performance, task completion quality and learning attitude. On the other hand, students can evaluate teachers' teaching design in terms of proficiency in using information platform and information processing ability.

### 3 RESEARCH DESIGN

#### 3.1 Research Purpose

The purpose of this study is to test the effectiveness of PIAE blended learning based on Xue Xi Tong in reading teaching by answering the following research questions: Does PIAE blended learning based on Xue Xi

Tong in reading teaching help English majors' reading ability? What is the students' attitude towards the PIAE blended learning based on Xue Xi Tong in reading teaching?

#### 3.2 Research Methodology

In this study, 64 English major freshmen from two parallel classes are selected to participate in the experiment. The experimental class adopts PIAE blended teaching mode based on Xue Xi Tong, while the control class adopts traditional teaching mode. During the whole experiment, the two classes are taught by the same teacher. Researchers use three experimental tools, namely, before-test, post-test and questionnaire. Before the experiment, 64 students are tested to evaluate the English reading level, so as to understand whether they have the same English reading ability and ensure that the experimental group and the control group have the same level in all aspects. After the experiment, the students' English reading ability is tested by post-test. By comparing the reading level before and after the test, the researchers can better understand the effect of PIAE blended learning based on Xue Xi Tong in reading teaching.

To ensure the reliability and validity of the test paper, the researchers chose the Vocabulary and Grammar, Cloze and Reading Comprehension in TEM-4 to test the students. The before-test and post-test are composed of two parts, 50 multiple choice questions, 2 points for each question, the total score of the paper is 100 points. In both the before-test and post-test, the same test papers are used in the experimental and control classes. In addition, 64 students in both classes don't take the TEM-4 paper before the experiment. Independent sample T test is used to investigate whether the reading level of the experimental class and the control class is similar in the before-test, and whether the reading level of the experimental class is more significantly improved than that of the control class in the post-test. Paired sample T test is used to test whether the experimental class and the control class have significant progress before and after the experiment.

After the experiment, a questionnaire survey is conducted among the students in the experimental class to further investigate whether their attitude and reading interest are improved by PIAE blended teaching based on Xue Xi Tong in reading teaching. There are 20 items in the questionnaire, which are composed of three parts. All items are subject to 5-level Likert scale, and 1-5 points are scored from completely disagreeing to completely agreeing. In order to ensure the reliability and validity of the questionnaire, the researchers conduct a preliminary study. After the preliminary study, SPSS 26.0 is used to analyze the reliability of the questionnaire. The results are shown in Table 1.

**Table 1** Reliability of questionnaire

Sample	Items	Cronbach's Alpha
32	20	0.913

As shown in Table 1, Cronbach's Alpha is .913, higher than .9, indicating the questionnaire has high internal consistency and good reliability.

**Table 2** Validity of questionnaire

KMO	0.670
Bartlett	581.942
df	190.000
Sig.	.005

As shown in Table 2, KMO is .670, higher than 0.6, and Sig. is .005, lower than 0.05, indicating that the validity of the questionnaire is accepted. To sum up, this questionnaire has good validity and reliability, which can be used to investigate students' attitudes towards PIAE blended teaching based on Xue Xi Tong in reading teaching.

## 4 EXPERIMENT RESULTS AND DISCUSSION

This experiment uses before-test to investigate whether the English reading level of the two classes is similar, and uses post-test to understand whether PIAE blended learning based on Xue Xi Tong is helpful to improve the reading ability of English majors. Through questionnaire survey, we understand students' attitude towards Xue Xi Tong in reading teaching. The datum collected from the test and questionnaire are analyzed with SPSS 26.0 to answer the research questions, and the results are discussed from the perspective of theoretical basis.

### 4.1 Before-test Results

Before the experiment, both the experimental class and the control class completed the before-test. The following tables show the results of the independent sample T test before the experiment, which is used to judge whether the two classes have the same level English reading ability.

**Table 3** Before-test datum

Before-test	Mean	Sample size	Standard deviation	Mean standard error
Control Class	56.44	32	7.849	1.388
Experimental Class	58.19	32	8.491	1.501

**Table 4** Before-test variance and t-test

Control Class -- Experimental Class	Correlation	Significance	M	SD	Paired Difference Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
						Lower limit	Upper limit			
						0.094	0.61			

As shown in Table 3, the mean score of the experimental class is 58.19, and the standard deviation is 8.491, while the mean score of the control class is 56.44, and the standard deviation is 7.849. As shown in Table 4, the significance is 0.61, the mean is -1.75, and the Sig. (double-tail) is .376, higher than 0.05. The results show that the English reading level of the experimental class and the control class is basically the same in the before-test stage, and there is no significant difference between them at the beginning of the experiment. Therefore, the

English reading level of the experimental class and the control class is basically the same before the experiment, and it is feasible to select the two classes as experimental subjects for the experiment.

### 4.2 Post-test Results

At the end of the experiment, both classes complete the post-test papers with a full score of 100, and the before-test and post-test papers have the same difficulty.

In order to further analyze whether students' reading level improve after the experiment, the researchers conduct

independent and paired sample T test on the post-test results, and the results are shown in the following tables.

**Table 5** Post-test datum

Post-test	Mean	N	Standard deviation	Std. Error Mean
Control Class	66.984	32	9.9891	1.7658
Experimental Class	74.875	32	9.4074	1.663

**Table 6** Post test variance and T test

Control Class -- Experimental Class	Correlation	Significance	Mean	SD	Paired Difference Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
						Lower limit	Upper limit			
	0.16	0.381	-7.891	12.576	2.2232	-12.4248	-3.3565	-3.549	31	0.001

As shown in Table 5, the average score of the experimental class is 74.875, and the average score of the control class is 66.984. The average difference between the experimental class and the control class is 7.8906. In addition, as can be seen from Table 6, Sig. (double-tailed) is less than 0.01, indicating that there is a significant difference between the experimental class and the control

class after the experiment. In order to further test whether the experimental class and the control class have made significant progress before and after the experiment, the author uses the paired sample T test to analyze the results of the experimental class and the control class, and the results are as follows.

**Table 7** Paired sample T test of Control class

Before-test - Post-test	Mean	Standard deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower limit	Upper limit			
	-10.5469	7.5363	1.3322	-13.264	-7.8297	-7.917	31	0.000

As shown in Table 7, the average score of the control class is -10.5469, that is, the average score of the control class increases by 10.5469. That is to say, the students' reading scores increase. In addition, the Sig. (double tail)

is 0.000, lower than the standard measurement of 0.05. Therefore, it can be concluded that students' reading ability is improved through the experiment.

**Table 8** Paired sample T test of Experimental class

Before-test -- Post-test	Mean	Standard deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower limit	Upper limit			
	-16.6875	11.1686	1.9744	-20.7142	-12.6608	-8.452	31	0.000

As shown in Table 8, the average value of the experimental class is -16.6875, that is, the average score of experimental class has increased by 16.6875 after the experiment. That is to say, when the teacher uses Xue Xi Tong to assist reading teaching in the experimental class, students' reading level has been greatly improved. Sig.(double tail) is 0.000, lower than the standard measurement of 0.05, which means that the experimental class has a significant improvement compared with the score before the experiment. That is to say, PIAE blended learning based on Xue Xi Tong has certain help for English major students' reading ability.

Combined with the results of the experimental datum, it is not difficult to find that the average score of English reading in the experimental class has increased by 16.6875, and the average score of the control class has increased by 10.5469. The average score of the experimental class is 7.8906 higher than that of the

control class. Sig. (double tail) is lower than the standard measurement value of 0.05, indicating that there is a significant difference in the post-test scores between the experimental class and the control class. Therefore, a conclusion can be drawn that PIAE blended learning based on Xue Xi Tong can effectively improve the reading ability of English majors.

### 4.3 Results of Questionnaire

The questionnaire consists of 20 questions. Items 1-6 investigate students' attitude towards using Xue Xi Tong in reading teaching, items 7-11 investigate students' attitude towards functions of Xue Xi Tong, and items 12-20 investigate whether using Xue Xi Tong in reading class could improve students' learning interest. After the experiment, all the students in the experimental class complete the questionnaire survey, and the results are analyzed as follows.

**Table 9** Students' attitude towards using Xue Xi Tong

Items	M	STD
1.I can accept teachers to use Xue Xi Tong to assist reading teaching.	4.52	0.62
2.I like teachers to use Xue Xi Tong to assist reading teaching.	4.30	0.77
3.I hope to continue to use Xue Xi Tong in my future study.	4.27	0.72
4.I would recommend Xue Xi Tong to other teachers and students.	3.79	0.86
5.I like teachers to use Xue Xi Tong to issue preview tasks.	4.27	0.72
6.I like teachers to use Xue Xi Tong to assign homework.	4.21	0.70

From the statistical data in Table 9, it can be seen that most students in the experimental class like teachers to use Xue Xi Tong to assist reading teaching and hope to continue to use Xue Xi Tong in future study. In addition,

most of the students like teachers to use Xue Xi Tong to release preview tasks and assign homework. The results show that students have a high acceptance of using Xue Xi Tong to assist English reading.

**Table10** Student's attitude towards functions of Xue Xi Tong

Items	M	STD
7.Group chat, topic discussion in Xue Xi Tong can stimulate my enthusiasm to speak in class.	3.97	0.95
8.The learning interface of Xue Xi Tong is designed to be very friendly and easy to use.	4.15	0.83
9.Courseware synchronization in Xue Xi Tong has brought great convenience to my study.	3.88	0.96
10.Selection and quick answer in Xue Xi Tong let me focus more on classroom learning.	3.82	0.73
11.Group chat and topic discussion help to realize real-time online and offline interaction with teachers.	4.15	0.71

To sum up, most students in the experimental class hold a positive attitude toward the role of Xue Xi Tong in English reading class. As can be seen from the statistical data in Table 10, students like to conduct previewing, reviewing and completing homework on Xue Xi Tong. Its user-friendly design improves students'

enthusiasm to speak in class, makes students more focused on classroom learning, promotes real-time online and offline interaction and communication between teachers and students, and brings great convenience to students' learning.

**Table 11** Can Xue Xi Tong improve students' Xue Xi Tong interest and reading level?

Items	M	STD
12. It is very interesting to use Xue Xi Tong in English reading course.	3.79	0.86
13. The classroom atmosphere became very active after the use of Xue Xi Tong in English reading course.	3.79	0.93
14. I actively and conscientiously completed all the tasks assigned by Xue Xi Tong.	4.39	0.56
15. After using Xue Xi Tong to assist reading teaching, my interest in reading has been improved significantly.	3.58	0.90
16. Using Xue Xi Tong to assist reading teaching can stimulate my enthusiasm for learning.	3.64	1.06
17. After using Xue Xi Tong to assist reading teaching, my preview and review time increased significantly.	3.64	0.96
18. It is good for me to develop good study habits to make use of Xue Xi Tong for preview and review.	3.94	0.79
19. After using Xue Xi Tong to assist reading teaching, my English reading level has been greatly improved.	3.52	0.91
20. My confidence in learning English has greatly improved after using the learning pass to assist reading teaching	3.48	0.97

As can be seen from the statistical data in Table 11, Xue Xi Tong can better supervise students to prepare before class and complete the learning task list independently, and can improve the interest of reading class and activate the teaching atmosphere. In addition, students' learning habits, reading interest and reading level have been improved to a certain extent.

## 5 CONCLUSIONS

The main purpose of this study is to investigate the effectiveness of Xue Xi Tong and students' attitude to Xue Xi Tong in reading teaching. Through the analysis

of students' before-test and post-test results and questionnaire, the following conclusions are drawn.

First of all, the study finds that PIAE blended teaching based on Xue Xi Tong is helpful to English major students' reading learning. Students' reading ability is improved, and the growth rate of the experimental class is higher than that of the control class. That is to say, compared with the traditional English reading teaching method, PIAE blended teaching based on Xue Xi Tong is more conducive to the students' interest in reading and improve reading ability. Based on these results, a conclusion is drawn that PIAE blended learning based on

Xue Xi Tong can effectively improve the reading ability of English majors.

Secondly, under the premise of the high penetration rate of Internet and smart phones, most learners have a high acceptance of PIAE blended learning based on Xue Xi Tong. The results show that Xue Xi Tong-assisted reading can stimulate students' learning interest, promote students to develop good reading habits, enhance students' confidence in learning English, and finally stimulate students' interest in learning English. All in all, the students in the experimental class hold a positive attitude towards Xue Xi Tong in English reading course.

In conclusion, the blended learning method based on Xue Xi Tong, which combines online learning with traditional offline face-to-face learning, is beneficial to the improvement of English major students' reading ability and has a positive impact on the teaching effect of reading course. After the introduction of PIAE blended learning mode, students' learning interest has been significantly improved, and their enthusiasm to participate in teaching activities in and out of the classroom has also been improved, which further proves that Xue Xi Tong is a scientific and intelligent teaching tool, which can be extended to the teaching of other subjects.

## PROJECT FUND

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