

Experimental Study of Flipped Classroom Teaching Model in the Context of "Internet+"

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Abstract: This study is based on the new development of the flipped classroom in the context of "Internet+". It investigates its effectiveness in university English teaching through experimental research. The study selected 80 first-year English major students from a university as the sample, and conducted a one-month teaching experiment using a large online education platform. The results of the study show that this teaching model overall enhances students' interest and participation in learning, significantly improves their comprehensive English language skills, especially their listening and speaking abilities. Therefore, leveraging information technology to implement the flipped classroom is one of the effective paths for reforming university English education. Subsequent research will expand the sample size and further explore the applicability of this teaching model.

Keywords: Internet+, flipped classroom, university English teaching, experimental research

1 Introduction

The widespread use of mobile internet and multimedia technology has made "Internet+ education" an important development direction. The flipped classroom is an innovative model of teaching reform that relies on internet technology and has been explored in primary and secondary education, but there is still limited research on its application in higher education language courses. This study takes university English teaching as an example and designs and validates the application model of the flipped classroom, extending the relevant theories and providing support for the informatization reform of such courses. The research is based on a sample of English major students from a university and evaluates the implementation effects of this model using methods such as questionnaires and tests, mainly involving the reconstruction of course resources, online interaction, and classroom activities. This study provides empirical support for promoting the transformation of network-based language teaching models [1].

2 The evolution of the flipped classroom in the context of "internet+"

The flipped classroom originated in American secondary education practices and refers to a teaching model that uses information technology such as online videos to reverse the

traditional process of "knowledge delivery" in the classroom with the "interactive application" process within the classroom [2]. In the era of "Internet+", this model has been deepened and expanded in terms of both ideology and methods. In terms of ideology, it emphasizes the development of subjectivity, openness, and applicability, as seen in new explorations such as "unflipping." In terms of technological means, it fully utilizes multimedia, data analysis, artificial intelligence, and other methods to create immersive and personalized learning spaces [3]. The "Internet+" environment provides richer support for the flipped classroom, pushing this model towards a more human-centered direction. However, how to strike a balance in the information wave, making full use of technological advantages while not losing the essence of education, still requires continuous reflection and optimization by practitioners [4].

3 Experimental design and strategies

3.1 Sample selection

For this experiment, the research sample consists of first-year students majoring in English from two relatively parallel classes in a prestigious university, with each class having approximately 40 students, totaling about 80 students. Considering the impact of sample size on experimental results, the research team employed a stratified random sampling method. They selected 20 students from each class to form the experimental group while the remaining students were assigned to the control group[5]. Stratified sampling was carried out by first dividing each class into three strata based on students' scores in the college entrance examination English and their interest in English learning. Then, within each stratum, 5 male and 5 female students were randomly selected to form the experimental group. This ensures that the experimental group represents the overall characteristics of students in terms of English proficiency and learning attitude. In the end, both the experimental group and the control group consisted of 40 students each, resulting in a total sample size of 80 students, which enhances the reliability of data analysis in later stages, as shown in Table 1. Additionally, an exit mechanism was established during the study. If any samples dropped out of the experiment midway, they were replaced by new samples from the same stratum to maintain a relatively constant sample size within each stratum. This stratified random sampling method guarantees the representativeness of the sample and the comparability of the control group, providing a certain level of quality assurance for the experimental results[6].

Table 1. Sample Distribution

Class	Total Number	Stratified Sampling Method	Experimental Group Size	Control Group Size
Class 1	40	Stratified by English Scores and Interest	20	20
Class 2	40	Stratified by English Scores and Interest	20	20
Total	80		40	40

3.2 Experimental teaching content and platform

Considering the flexibility of the content for undergraduate-level English learning and the control requirements of the research, this experiment selected the first volume of the newly

compiled Standard College English Comprehensive Course as the teaching content. This textbook is widely recognized as a standard English teaching material for college students. Its content is practical and aligns with the requirements of the college English teaching syllabus, making it suitable for first-year English level students[7]. Regarding the teaching platform, this research utilized a large online education platform and its mobile application. This platform offers various functional modules, including a self-study area, teacher-student interaction area, and student community. The self-study area provides resources such as video micro-lessons, electronic courseware, practice quizzes, and vocabulary memorization tools. The teacher-student interaction area includes sections for asking questions, discussions, homework correction, and announcements. The student community allows for activities like peer assessment of assignments, free communication, and resource sharing[8]. Please refer to Figure 1 for an illustration.

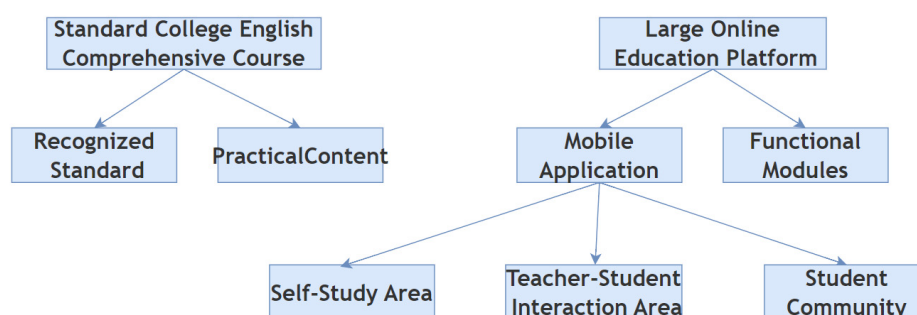


Figure 1. Experimental Teaching Content and Platform

The seamless integration of these functional modules effectively supports the implementation of the flipped classroom model. The research team also developed additional mobile learning applications based on this platform, creating a blended learning support system that combines online and offline learning[8].

3.3 Experimental process steps

This experiment is divided into three main process steps: the pre-experiment phase, the formal experiment phase, and the results verification phase. In the pre-experiment phase, the primary focus is on preparing the necessary teaching resources for transitioning to the flipped classroom model. This includes tasks such as recording video micro-lessons, creating electronic lesson plans, and designing knowledge quizzes[9]. Additionally, during this phase, the participating students receive training on using the online platform to ensure they have a comprehensive understanding of the platform's functionalities and can use them proficiently. The formal experiment phase spans approximately three months and follows a predefined teaching syllabus. The flipped classroom teaching is systematically implemented during this phase, including activities such as pre-class preparation, in-class interaction, and post-class assessments. Throughout the entire experimental process, the research team simultaneously collects data, including platform learning behavior data, questionnaire measurements, and interview records[10]. Upon the conclusion of one semester of teaching experimentation, the results verification phase begins. In this phase, both quantitative and

qualitative data collected are subjected to statistical analysis. This analysis aims to validate hypotheses and evaluate the effectiveness of the teaching approach. Please refer to Figure 2 for an illustration.

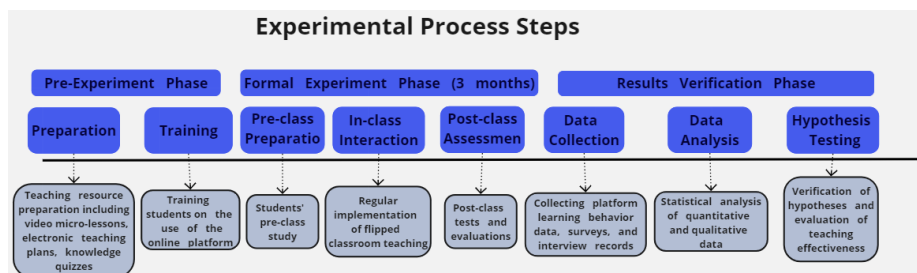


Figure 2. Experimental Process Steps

4 Building and implementing the flipped classroom

4.1 Preparatory resource development and creation of online interactive space

In the flipped classroom model, the research team has designed a variety of preparatory resources to enhance student self-directed learning. These resources include approximately 10-minute video micro-lessons, which emphasize grammar and vocabulary difficulties and include interactive elements such as reflection questions and quizzes. Additionally, the team has created various practice questions covering vocabulary, phrases, grammar, comprehension, and selected English popular science articles to test reading comprehension. These resources are integrated into learning modules and published on the online platform. To promote interaction, the research team has added a micro-lesson discussion area and a reading comprehension area on the platform, as well as a composition peer-review area that allows students to submit written work and evaluate each other. These designs aim to facilitate communication among students and help teachers assess the effectiveness of pre-class preparation, thereby guiding offline teaching.

4.2 Classroom activity design

Building upon the foundation of pre-class preparation and online interaction, offline teaching activities have been restructured to emphasize student active participation and the application of knowledge. Teachers provide supplementary explanations on the key and challenging points of the micro-lessons, and they encourage students to engage in spoken dialogues, speeches, and translations to promote active English language usage. Students work on designated tasks within groups, such as discussing topics provided or translating a Chinese news article together, fostering cooperation and communication. Teachers address common issues that arise during pre-class preparation and online interaction and provide formative assessments based on student performance. Monitoring of learning outcomes is done through various means, including in-class quizzes. These interactive elements are integrated throughout the overall classroom activities.

$$C = T + S + \sum_i A_i + P + I + F + Q$$

In the notation below: T represents the role of the teacher; S represents students; A represents activities, which can be divided into A₁, A₂, A₃, and so on, where A₁ is group discussion, A₂ is presentations, A₃ is translation exercises, etc; P represents pre-class preparation content; I represents online interaction; C represents classroom teaching; F represents formative assessment; Q represents in-class quizzes.

4.3 Process data tracking

To comprehensively assess the effectiveness of the flipped classroom model, the research team implemented a comprehensive approach during the teaching experiment, combining online platform learning behavior data and regular questionnaire surveys to track process data of students. They analyzed students' weekly self-study time (average of 3.5 hours) and online interaction frequency (average of 5 times per week). Additionally, they examined changes in students' English learning conditions and their learning experience as collected through questionnaire surveys. For example, student satisfaction increased from 30% to 70%, as well as an improvement in satisfaction with the flipped classroom. These data provided a basis for comparative analysis in the final tests and validated the research hypotheses in later analysis, offering critical support for evaluating the effectiveness of the teaching model.

5 Experimental effectiveness and impact analysis

5.1 Evaluation of student learning outcomes

To comprehensively assess the impact of the flipped classroom teaching model on students' English learning, the research team employed both quantitative and qualitative measurement methods, utilizing questionnaires and tests. In terms of quantitative measurement, pre-tests and post-tests were conducted for the 80 students in the experimental group and the control group. The tests covered listening, speaking, reading, and writing modules, with a maximum possible score of 150 points. The data obtained revealed that after the experiment, the experimental group showed a significant improvement in their comprehensive English language skills. The average score increased from 90.8 points before the experiment to 118.2 points at the end of the experiment, representing a growth rate of 30.1%. In contrast, the control group's average score showed only a slight increase of around 3.4%. Furthermore, when looking at listening and speaking aspects, the experimental group showed even greater improvements, with increases of 27% and 31%, respectively. This indicates that the flipped classroom model, through video content and online interaction, significantly enhanced students' skills in these two areas. Regarding learning outcomes, more than 80% of the experimental group students achieved a "good" grade or higher in the final tests, while the control group had only around 50%, as shown in Figure 3.

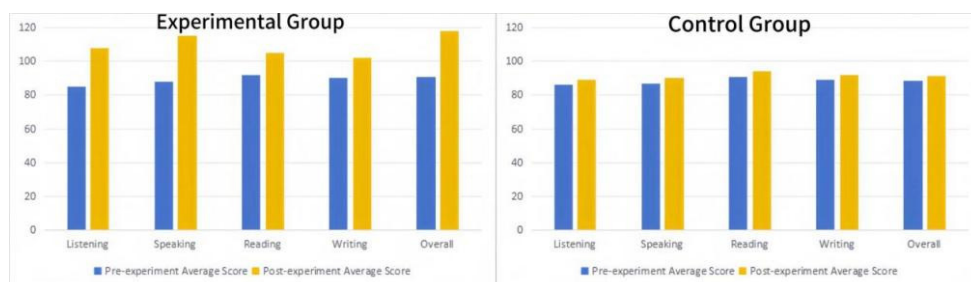


Figure 3. Comparative Trends in Score Changes between the Experimental Group and Control Group

5.2 Factors of influence analysis

After conducting a correlation analysis of the data, the research team found that the differences in individual English proficiency levels could have a certain impact on the effectiveness of the flipped classroom teaching. Students with better basic English skills at the beginner level were more likely to benefit from classroom discussions and interactions, resulting in more significant improvements. On the other hand, students with weaker foundations relied more on the language input from the video courses, leading to relatively less direct improvement. Additionally, the amount of self-study time and the level of participation on the online platform also had a positive correlation with the final learning outcomes. In summary, the research team believed that this teaching model would benefit from adaptive optimization in terms of high-quality differentiated learning resources and process-oriented learning support to achieve more personalized and satisfactory teaching results.

6 Conclusion

This study explored the use of a flipped classroom model for college English facilitated by Internet+ technology. It was found to enhance self-directed learning, increase online interaction, and improve in-person class activities. The model notably boosted students' engagement and English skills, particularly in listening and speaking. The findings suggest that internet-based flipped classrooms are beneficial for college English reform and development. Future work should expand research scope and examine various viewpoints to refine the approach.

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