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Research Article

English Flipped Classroom Teaching Model Based on Cooperative Learning

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Abstract

The ultimate goal of English teaching is to cultivate students with strong language application ability. The traditional mode of teaching and learning in College English classroom can no longer meet the requirements of College English teaching reform. Cooperative learning model can help teachers eliminate the disadvantages of traditional English teaching and provide students with an open and free space, which is in good agreement with the flipped classroom teaching model. The flipped classroom teaching mode based on cooperative learning can improve students' autonomous learning ability and communication ability, and it also can cultivate their innovative thinking and team spirit. In this paper we conduct an empirical study on the influencing factors of teaching satisfaction, the relationship between learning behavior engagement and academic achievement under the flipped classroom teaching mode based on cooperative learning. It proves that the application of cooperative learning model in College English flipped classroom will bring a more efficient classroom to teachers and students.

Keywords

Flipped Classroom • College English • Learning Behavior Engagement • Cooperative Learning • Empirical Study

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At present, the learning effect of traditional college English classroom is not ideal. The teaching content prepared by teachers before class cannot be effectively imparted to students. The main reason is that students' interest in learning is declining, and most teachers are still using traditional indoctrination teaching methods. Cooperative learning model provides a good way to solve this problem.

Cooperative learning is a structured and systematic learning strategy (Slavin, 1980; Slavin, 1981). There are 2-6 members in the learning group. They have different abilities and learn from each other. They mainly complete their learning activities in a cooperative and mutually supportive way to achieve the goal of group cooperative learning. Under this learning mode, students' psychological pressure in the classroom can be reduced, thus it will improve the classroom atmosphere, form a benign interaction between teachers and students and between students and students. But cooperative learning teaching model requires students to learn a lot of knowledge in advance outside the classroom.

Flipped classroom (O'Flaherty & Phillips, 2015) is a kind of teaching mode that transfers the teaching activities carried out in traditional classroom teaching to those outside the classroom. Through combining flipped classroom with cooperative learning, students' autonomous learning ability and communication ability can be improved.

In this paper, English major college students are taken as the research object, the influencing factors of teaching satisfaction, the relationship between learning engagement and achievement under the flipped classroom teaching mode based on cooperative learning are studied. The empirical results show that students' expectation, acceptance and satisfaction have great influence on the flipped classroom teaching model, and behavior engagement has a direct and significant effect on academic performance under the flipped classroom teaching mode based on cooperative learning.

Related Works

The theoretical research of flipped classroom mainly includes teaching mode research, teaching design research and teacher-student relationship research. Herreid *et al.*, (2013) constructed a flipped classroom teaching model on the basis of a large number of case studies of flipped classroom teaching. Ying (2017) clarified the orientation of teacher's role and student's role by interpreting the connotation of the flipped classroom teaching mode. They conducted research around the three factors of micro-class design, personalized cooperative learning environment construction and classroom activity design. Liebert *et al.* (2016) probed into some problems in the practice of flipped classroom teaching mode and how to solve them. Someone designed a relatively complete teaching design scheme based on the proposed flipped classroom teaching model. The teaching design scheme was applied to the actual classroom and its effect was tested. Galway *et al.*, (2014) argued that the field of higher education is concerned with the establishment of flipped classroom teaching mode or process, while the field of basic education focuses on the details of the flipping process. Someone discussed the combination of game teaching and flipped classroom, and they proved the effectiveness of game

teaching through teaching cases. Someone proposed a new teaching model of flipped classroom based on constructivist learning theory and systematic teaching design theory.

Cooperative learning has a long history and it is regarded as one of the most effective teaching and learning methods. Cooperative learning makes full use of the interaction between students and students, and it effectively makes up for the shortcomings of class teaching and individual learning. At present, cooperative learning mainly focuses on the theoretical research of cooperative learning, the application of cooperative learning in specific disciplines, and the application of cooperative learning in English teaching.

The theoretical research of cooperative learning mainly focuses on the effectiveness of cooperative learning in teaching and how to improve the effectiveness of cooperative learning. Ester & David. (2017) expounded theoretically how to improve the teaching efficiency of cooperative learning from four aspects: preparation before class, implementation in class, evaluation and reflection, application and promotion. Hsiung (2012) pointed out that the effectiveness of cooperative learning is not high at present. Combining the teaching experience and the characteristics of classroom teaching, they elaborated on three aspects to improve the effectiveness of group cooperative learning. Tarim (2009) pointed out that there are some problems in group cooperative learning, such as unscientific grouping, unclear rules, insufficient time and incomplete evaluation. In order to improve the effectiveness of group cooperative learning, a variety of evaluation and reward mechanisms should be adopted. Zhang *et al.*, (2017) pointed out that the application of cooperative learning in English teaching can make students pay more attention to contextual experience and emotional practice, and pay more attention to the cultivation of thinking and personality development. Someone discussed the connotation and significance of cooperative learning and applied it to college English reading teaching. The research found that cooperative learning theory can effectively improve the quality of College English teaching and help to cultivate students' cooperative awareness and innovation ability. Ruan conducted a survey on students' English reading. By analyzing students' English application ability and examination situation, they pointed out the reasons for students' difficulties in reading and proposed the method of applying cooperative learning to English reading teaching. Maxson *et al.*, (2015) analyzed the relationship between micro-courses and flipped classes in Institutions of higher learning as a breakthrough point, and analyzed the misunderstandings in the design of micro-courses in Institutions of higher learning and the problems in the process of making micro-courses.

Design of College English Flipped Classroom Teaching Model Based on Cooperative Learning

Basic elements of cooperative learning

(1) Heterogeneous grouping: heterogeneous grouping refers to assigning students to different groups according to their gender, personality, interest, ability and academic achievement, which will keep the balance among groups as far as possible, and each group of students can complement each other.

(2) Positive interdependence among members: positive interdependence construction is the core of cooperative learning. Cooperative learning group has a common goal. Every student has the relationship of honor and disgrace with the group classmates. The success of the group as a whole is its own success. Every team member should work together to experience individual success experience by means of information sharing, role playing and collective reward.

(3) Face-to-face interaction: cooperative learning provides favorable conditions for face-to-face communication between students. Students in the group work together to complete tasks, encourage each other, help each other, depend on each other and support each other. Team members are therefore more confident.

(4) Unshirkable personal responsibility: In cooperative learning, all members have certain responsibilities and must do their duty, which requires a reasonable division of labor within the group, and all tasks are implemented to member. Individual learning of all team members is very important for the final success of the group, which also makes everyone a strong person within the scope of possible. Usually when grouping, the number of member in each group is better controlled between 3 and 7. The fewer the number of member in the group, the greater the personal responsibility of each member. Each team member is tested, and the activities of the whole group are evaluated on the basis of their individual test scores. Team members were asked to report on their cooperative learning status in their group from time to time. Each group should have an observer who registers the number of times each group member contributes to its group's cooperative learning. A team member is assigned to act as the "supervisor" of the group to check whether all members of the group can accurately tell the team's answers. Let each learner explain what he or she has learned to other members.

(5) Social skills: Cooperative learning is more complex than competitive learning and individual independent learning because students have to perform multiple tasks at the same time. Therefore, it is also very important for team members to know how to cooperate and communicate with others. Before the beginning of cooperative learning, teachers can train students' cooperative skills, such as how to communicate with each other, trust each other, help each other, tolerance and understanding, and solve problems innovatively. Effective team members' cooperative skills are conducive to ultimate success.

(6) Group evaluation: Group evaluation means that the whole group should constantly reflect on their cooperation to ensure the effectiveness of cooperative learning. The followings should be included: Team members should learn from each other, support each other, accept each other and improve together based on the successful experience summarized in the group. When there are problems in the group, the members of the group should analyze the reasons in time, look at the problems rationally and find solutions to avoid similar problems again. It can be seen from the above that team members can get encouragement and suggestions from these evaluations, and they will be more confident of their ability to achieve common goals and achieve success after learning lessons and introspecting themselves.

Design of teaching mode

Pre-class knowledge extraction and micro-class production stage. At this stage, the main task of teachers is to design the whole teaching content, to determine the teaching objectives of each part of the teaching content,

to screen out the knowledge points that need to be mastered and the difficulties that need to be solved urgently, to put forward the enlightening and guiding problems that drive the teaching development, to design online learning tasks and closed exercises.

Based on above procedures, teachers need to write a detailed micro-lesson design idea, list the micro-lesson production framework and procedures, collect relevant teaching resources and materials, use relevant software to produce high-quality micro-lesson video, and publish it to the learning sharing platform resource area, at the same time, inform students through the platform notification function.

Pre-class autonomous learning and cooperative learning stage. After receiving the learning instructions and assignments from teachers through the platform notification release window, students use mobile phones to enter the learning area anytime and anywhere for pre-class learning according to their learning habits, learning methods and time arrangement, complete the initial absorption and internalization of knowledge, and test their understanding and mastery of knowledge in the ability testing area.

In this process, if students encounter deviations in understanding or problems that are difficult to solve in learning, they can always ask teachers and classmates for advice and help through the platform chat window, or go to the learning discussion area for interactive discussion between teachers and students. Finally, students can complete the further absorption and internalization of knowledge through independent or cooperative learning.

To ensure the quality and smooth progress of the learning task in this link, teachers' supervision and management are indispensable. Teachers should supervise and guide students at any time.

The presentation and evaluation feedback stage. After autonomous and cooperative learning before class, students have completed the initial assimilation and internalization of knowledge, and they come to class with learning results and learning doubts to report and display and seek the help of teachers. The presentation of students' classroom reports can be presented in groups, situational dialogues, role-playing, keynote speeches, drama performances, debates and other forms according to the learning content. In this process, teachers should play a good role as organizers, controllers and evaluators of activities, inspire and guide students to summarize learning activities, and further promote students' absorption and internalization of knowledge.

Consolidation after class and vacancy compensation stage. After the previous two methods of cooperative learning and flipped classroom teaching, students' learning of relevant knowledge has changed from the understanding level to the application level, and the absorption and internalization of knowledge has been completed. The main task of this stage is to further strengthen and consolidate the absorption and internalization of knowledge and systematize the knowledge. Teachers design and compile knowledge competence test questions and assignments at this stage, and provide them to students through the flipped classroom platform. Students learn to complete these expansive tests to further consolidate their knowledge, complete relevant homework, and pass the homework to teachers for reviewing and evaluating.

The whole process of flipped classroom teaching model based on cooperative learning is shown in Figure 1.

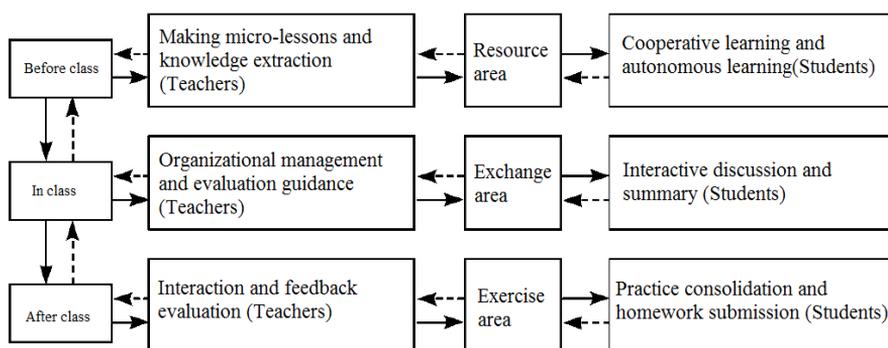


Figure 1. The whole process of flipped classroom teaching model based on cooperative learning.

Empirical studies of flipped classroom teaching model based on cooperative learning

Empirical study on the influencing factors of teaching satisfaction

Based on the International Technology Acceptance Model and the American Consumer Satisfaction Scale, combined with the related literatures on the study of flipped classroom teaching mode, and the current situation and objective facts of students' English learning are fully considered, the study designed a questionnaire on the satisfaction of flipped classroom teaching mode based on cooperative learning. The reliability, validity and correlation of each measurement variable are explored by factor analysis.

Considering the high expectation of learners in the technical level and subjective initiative of the flipped classroom teaching mode, the design dimension and project setting of the questionnaire are mainly based on theoretical model, existing scales, relevant important literature and teaching practice. Therefore, we choose three variables as observation variables: learner expectation, learner acceptance and learner satisfaction. Learner acceptance includes five dimensions: operability, practicability, ease of use of online courses, effectiveness of online classes and interaction of face-to-face classes.

The questionnaire in this study mainly includes two parts: the main part of the questionnaire and the description of personal information. The main part is composed of 35 questions designed from different perspectives of the flipped classroom teaching model. In order to ensure the reliability and validity of the questionnaire, reverse items are added to each question. Personal information description mainly includes gender, age, specialty, initial English achievement and so on. The questionnaires were administered with a general Likert scale,

The subjects of this study are 130 students from three majors in the first year of a foreign language college in China. All participants in the experiment accepted a one-year flipped classroom teaching practice, including 72-hour online course learning tasks. After the experiment, a questionnaire survey was conducted among the participants. 130 questionnaires were sent out and 125 questionnaires were received. Five invalid questionnaires

were screened out and 120 valid questionnaires were actually sent out. The validity rate of the questionnaires was 96%.

The principal component method in statistical analysis is used to analyze and measure the collected data, which can test the validity of the collected data well. At the same time, the relationship between statistical variables can also be observed effectively. We use factor analysis to analyze the questionnaire data, and use KMO and Bartlett test to sample the data according to the eigenvalue greater than 1. According to KMO statistical standard, when $KMO > 0.9$, factor analysis can be carried out ideally. We randomly selected 30 questions from 35 questions and selected 7 factors for KMO test. The test value was 0.807. It shows that there is no significant difference in the correlation between the observed variables. In addition, the approximate chi-square value of Bartlett sphere test is 1537.79, the Sig. value is 0.003, which is less than the minimum requirement of 0.05. From this, it can be seen that the zero hypothesis of Bartlett sphere test is not valid and the values of each variable are correlated. Therefore, the study sample is more suitable for factor analysis.

KMO and Bartlett test statistics is shown in Table 1.

Table 1
KMO and Bartlett Test Statistics

KMO measure		0.807
Bartlett sphere test	Approximate chi-square value	1537.79
	df	355
	Sig.	0.03

In order to test learners' satisfaction with the flipped classroom teaching model, it is necessary to analyze the reliability of the factors involved in the problem. The commonly used method of reliability test is Cronbach's Alpha coefficient. It is generally believed that when $\alpha > 0.6$, the reliability of statistical analysis data is higher. The overall α reliability coefficient of the questionnaire is 0.87, which indicates that the reliability of the questionnaire is very high.

The results of reliability analysis show that Cronbach's Alpha coefficients are between 0.66 and 0.77, which fully shows that the questionnaire items have high reliability and the consistency among the factors is good. At the same time, it also shows that the three common factors selected in this study can better measure learners' satisfaction with the college English flipped classroom teaching model.

Reliability analysis statistics is shown in Table 2.

Table 2
Reliability analysis statistics

Item factors	Cronbach's Alpha
Learner expectation	0.745
	Operability of Learning Platform
	Practicality of Learning Platform
Acceptance dimension	Usability of Online Courses
	The Usefulness of Online Classroom
	Interaction in face-to-face class
Learner satisfaction	0.761
Overall item reliability	0.860

In order to observe the satisfaction of each factor to the teaching of the flipped classroom teaching mode and a powerful data reference for the future teaching reform is provided, we will select three common factors

as independent variables, continue to observe the overall satisfaction of the flipped classroom teaching mode as dependent variables, and regression equation analysis is made.

From the scatter plot of regression equation analysis, it can be seen (Figure 2) that the standardized residuals mainly fall between (-2,2), which indicates that the learners' overall satisfaction with the teaching mode of College English flipped classroom is higher and the fitting degree is better.

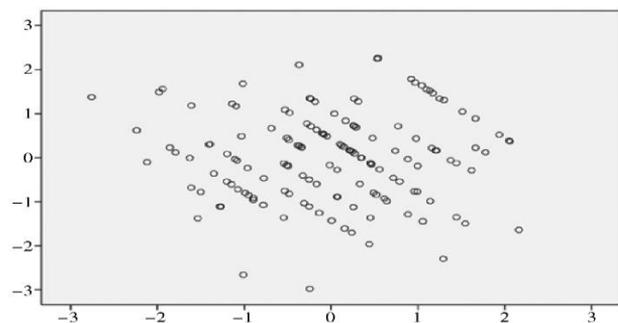


Figure 2. The scatter plot of regression equation analysis.

T-test was used to analyze learner expectation, learner acceptance and learner satisfaction. The values of Sig. were 0.043, 0.045 and 0.032, respectively. There were significant differences in the Sig. values.

Expectation statistics of college English flipped classroom is shown in Table 3.

Table 3
Expectation Statistics of College English Flipped Classroom

Observed variable	Mean value	Standard deviation	T value	Sig.
Learner expectation	3.39	1.16	-2.087	0.043
Learner acceptance	3.37	1.27	-2.287	0.044
Learner satisfaction	3.41	1.12	-2.128	0.036

Empirical study on the relationship between learning behavior engagement and academic achievement

The purpose of this study is to examine the relationship between college students' English learning behavior engagement and their academic performance under the flipped classroom teaching model.

The subjects of this study are 218 students selected randomly from more than 1,900 students who participated in the experimental class of College English flipped classroom. 206 questionnaires were collected and 202 college students were valid after 4 invalid questionnaires were excluded.

In order to clarify the distinction and validity of the items in the English learning engagement scale, item analysis is carried out first. The subjects' scores on all items were accumulated, and then ranked according to their scores. 27% of the subjects before and after the scores were regarded as high group and low group respectively. The results of independent sample t-test on the scores of the two groups on each specific item showed that there were significant differences in the scores of all items between the two groups. The reliability test of the scale shows that Cronbach's α is 0.870, which indicates that the scale of learning engagement has

high reliability. Secondly, in order to determine whether the data is suitable for factor analysis, the structural validity of the learning engagement scale was tested. The results showed that KMO and Barlett sphere test values were 0.860 and 0.000 respectively, it indicated that the scale was more suitable for factor analysis. Therefore, we conducted exploratory factor analysis on the obtained data, and four factors for English learning behavior engagement were identified based on the criterion of eigenvalue greater than 1. Subsequent reliability analysis showed that the reliability coefficients of each factor were higher, it indicated that the scale had good reliability.

Factor analysis of learning behavior engagement is shown in Table 4.

Table 4 shows that the factor load of all items in the four factors is larger. Because the four items of the first factor are mainly about college students' autonomy and initiative in English learning, they are named "autonomous learning". The four items of the second factor mainly reflect the cooperative learning of college students with their classmates and teachers, they are named "cooperative learning". Four items of the third factor are related to students' persistence in learning plan and their efforts to overcome learning difficulties. They are named "persistent learning". The fourth factor is named "focused learning", because the three items it contains are mainly related to college students' concentration and inability to cope with in learning.

English learning behavior engagement, which consists of autonomous learning, focused learning, persistent learning and cooperative learning, has a significant positive impact on College Students' academic performance. In the process of English learning, the students who devote more to their behavior can actively find and create learning opportunities to study. They study seriously and concentrate on learning. When they encounter learning difficulties, they will try to solve them by seeking help from teachers and classmates. They will not give up easily, so they can easily achieve good academic results.

Table 4

Factor analysis of learning behavior engagement

Item number	Learning behavior engagement factors				Contribution rate
	Autonomous learning	Cooperative learning	Persistent learning	Focused learning	
Q33	0.782				0.742
Q34	0.767				0.663
Q37	0.687				0.670
Q42	0.626				0.672
Q39		0.729			0.638
Q47		0.717			0.613
Q49		0.636			0.486
Q50		0.562			0.582
Q38			0.686		0.593
Q32			0.612		0.468
Q36			0.607		0.625
Q45			0.579		0.578
Q48				0.698	0.502
Q41				0.671	0.667
Q46				0.618	0.628
Analytic variance	17.119	13.987	14.379	13.863	
Reliability	0.786	0.698	0.712	0.647	

Conclusions

College English teaching under the flipped classroom mode requires not only students' autonomous learning before class, but also their interaction with classmates and teachers before class or in class, and cooperative learning. Compared with traditional English teaching, cooperative learning in the flipped classroom mode should not be reduced, but should be increased. In the flipped classroom, cooperative learning and interactive learning between teachers and students create an environment for students to build knowledge, so that they can get psychological and emotional support, thus actively invest in learning, build knowledge and achieve learning objectives.

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