

Informed Consent

Dear Mr./Miss _____:

We invite you to participate in the study. Participation in this study is entirely your choice. This informed consent will provide you with some information concerning the study. You should read it carefully and then make your decision carefully about whether to participate. If you have any questions, feel free to ask the researchers for an explanation. You can discuss it with your teachers, classmates, family and friends to help you decide whether to voluntarily participate. You have the rights to refuse and to withdraw from the study at any time without penalty or loss of your rights.

If you agree to participate, we will require you to sign and date this informed consent. You will be given a signed and dated copy for your keeping.

Your participation in this study is voluntary, and this study has been reviewed by Air Force Aviation University's Ethics Committee.

【Name of study】 Effect of Blended Teaching on College Students' EFL Acquisition

【Undertaking department】 Basic sciences Department of Air Force Aviation University

【Head of study】 Yanan Tao

【funder】 Self-funded

【Research background and significance】

Currently, blended teaching has gained widespread adoption in higher education, particularly in the domain of second language teaching, where notable advancements have been made on a substantial scale in university education. Numerous scholars (López-Pérez, 2011; Chen, 2015; Feng, 2016; Ige and Hlalele, 2017; Jiang and Hu, 2018; Ma et al., 2021; LV, 2021) have acknowledged the positive impact of blended teaching on second language acquisition. It is widely accepted that this teaching mode can optimize the learning process, enhance the independent learning capabilities of college students, improve overall satisfaction with the learning experience, and foster the development of innovative and critical thinking skills (Diep et al., 2017; Wu et al., 2010).

However, there remains a dearth of empirical studies into the impact of blended teaching on second language acquisition. While theoretical studies posit that blended teaching may alleviate cognitive load and yield positive effects in second language acquisition (Ilic et al., 2015; Henrie et al., 2015; Kintu et al., 2017), the empirical findings are somewhat incongruous. For instance, with regard to overall language proficiency, Oweis (2018), Fakhir and Ibrahim (2018), and Nazzal and Alradi (2020) discovered that university students who received blended teaching exhibited a moderate enhancement in their English scores. Conversely, Kwak et al. (2015) claimed that blended teaching had either no effect or a detrimental impact on the learning process. In a study conducted by Gao (2021), the CET 4 (College English Test Band Four) score, known for its high reliability and validity, was employed as a measure of language proficiency. The findings revealed that students' foreign language ability exhibited only marginal improvement or even no noticeable

difference in the later stages of blended teaching. Regarding the decomposable indicators of language proficiency, Hou (2010) verified the impact of blended English listening teaching, but determined that this teaching modality failed to enhance students' writing skills. Conversely, Meng's (2011) analysis indicated that blended teaching contributed to a moderate improvement in students' writing skills. Additionally, Liu's (2016) research demonstrated a slight difference in students' English listening and speaking abilities before and after experiment, contradicting the findings of Hou (2010).

These studies have significantly contributed to the scholarly understanding of blended teaching in second language acquisition. However, they also exhibit certain limitations in terms of experimental design and research methodologies. Primarily, these studies often rely on convenience sampling and utilize parallel classes as the subjects of experimental research, without strictly controlling for the experimental environment. This approach leads to selective grouping and compromises the unbiased estimation of teaching effects. Secondly, these studies primarily employ qualitative analysis methods to examine the correlation between a single explanatory variable (i.e., student participation in blended teaching) and a response variable (language performance or course satisfaction). However, they often overlook the influence of other crucial control variables, thereby limiting the explanatory power and generalizability of their findings. Moreover, the current research on blended second language teaching predominantly focuses on changes in the mean values of classroom effectiveness, neglecting the individual differences among learners. Accordingly, they fail to comprehensively and consistently describe the impact of blended teaching on learners of varying proficiency levels while this aspect is closely tied to the fairness and applicability of blended teaching in second language teaching practice.

In effect, previous research has demonstrated that early-stage academic achievement variables and demographic variables play a significant role in influencing the effectiveness of blended teaching. For instance, Calimeris and Sauer (2015) utilized the ordinary least square (OLS) model to control for learners' socioeconomic status (SES) and prior academic performance. They examined the impact of blended teaching in economics courses and discovered that the experimental group achieved significantly higher scores in mid-term and final exams compared to the control group. Similarly, after controlling for these variables, Foldnes (2016), He et al. (2016), as well as Asarta and Schmidt (2017) found that students who participated in blended teaching outperformed those who received traditional teaching in the fields of economics, science, and engineering.

Therefore, it is of great significance to take early-stage academic achievement variables and demographic variables into consideration when conducting empirical study concerning blended EFL teaching and employ proper experimental design and research methodologies to measure blended teaching in second language acquisition.

【Research objective and content】

Based on the aforementioned understanding, this study will initiate with an exploration into the blended teaching approach employed in a provincial normal university for college English courses, aiming to assess the impact of blended teaching on second language acquisition by college students. This assessment will be conducted by examining the composition of language ability and individual differences, while controlling for relevant academic performance and demographic variables. Therefore, a more comprehensive examination of the blended teaching effects on second language acquisition will be undertaken. To begin, the study will employ a multiple linear regression model to determine the relationship between blended teaching and college students' English language proficiency. Subsequently, a conditional quantile regression model will be utilized to explore the influence boundaries of blended teaching. Finally, the estimated results from both analyses will be synthesized to determine the effectiveness of blended teaching. This study will address the following three key issues:

- (1) To what extent does blended teaching influence English reading, listening, writing, and overall English proficiency of college students?
- (2) How do English language acquisition situations vary among students at different proficiency levels within a blended teaching environment?
- (3) What is the distribution of the impact of blended teaching across the entire sample interval?

【Research procedures】

1. Course design

In this study, 7 parallel classes will be selected as the experimental group of blended teaching intervention, using blended teaching, and 5 remaining classes as the control group of the study, adopting traditional teaching methods. Based on the New Vision University English series of textbooks, the teaching team will produce MOOCs and learning tasks and upload them to the learning platform, including vocabulary, grammar, reading, listening, translation and writing, and students can log in to the teaching platform to learn videos, complete assignments and tests at any time. Before class, teachers will set up online learning tasks and supporting resources, and required students in the experimental group to complete 2 hours of online independent learning and submit problems or difficulties that are encountered in the self-study process, and teachers will provide personalized guidance according to the collected data. In the face-to-face teaching session, teachers and students will sort out the learning content of the previous stage through various learning activities such as Q&A and group cooperation to achieve the purpose of in-depth learning. At the same time, teachers will conduct more targeted classroom Q&A and learning intervention based on the data and results of the learning platform. In the evaluation phase, teachers will design course assessment modules and give timely feedback to students, who will consolidate what they have learned by completing assignments, exercises and tests. The control group will adopt the traditional teaching method and do not need to complete the learning tasks of the learning platform. In order to reduce the influence of macro environment on learners' performance, the both groups will remain basically consistent in other learning conditions during course teaching.

2. Stylized facts analysis

After obtaining consent, the study will collect relevant data and information in the student's learning process, and establish a cross-sectional panel covering demographic variables such as age, gender, college entrance examination English scores, major in high school, as well as variables such as listening, reading, writing and overall scores of CET4 and CET 6 and then analyze the randomness of the sample, and establish the causal relationship of the research variables.

3. Apply five quantile to measure the overall effect

The CET4 and CET6 tests will be utilized as language proficiency assessments, with the former representing an earlier evaluation and the latter representing a later evaluation. To account for individual learner differences, the study will present the performance of the sample data across five quantiles. In addition, the study will plot the Probability Density Functions (PDFs) and Cumulative Distribution Functions (CDFs) pertaining to the CET6 scores within both the experimental and control groups to obtain the overall effect of EFL blended teaching.

4. Formulate and apply multiple linear regression equations and conditional quantile model to measure impact of blended teaching on different language abilities and on learners of different language proficiency levels.

Based on the aforementioned analysis, the study will formulate multiple linear regression equation and conditional quantile model to estimate the teaching effect of blended teaching more accurately. First, the study will explain the variables in equation and model, and then use them to reflect the whole picture of the entire conditioned effect distribution, and investigate the impact of blended teaching on various language abilities and the impact on learners of different language levels.

Utilizing multiple linear regression equation, the Cet6, Cet6r, Cet6l, and Cet6w scores will be employed as response variables to control pre-experiment English ability and demographic variables. This allows for the measurement of the impact of blended teaching on English acquisition. Firstly, check whether the estimated coefficients align with the theoretical expectations. Secondly, adopt the goodness-of-fit to explain variation in English scores among the samples.

For the purpose of appraising the impact boundaries of blended teaching, conditional quantile model will be employed to conduct a horizontal decomposition of the blended teaching effect, factoring in the individual variances among learners. By conditional quantile model, and taking the unit of 1%, a regression analysis will be conducted on the language scores of the two groups. The obtained results will be then subjected to linear fitting, yielding the distribution curve representing the effect of blended teaching across the entire sample interval.

5. Draw a conclusion and provide suggestions for blended teaching design.

【Criteria for participation】

Inclusion Criteria:

1. Have received systematic English learning in high school;
2. Have participated in and passed the December CET-4 exam.

Exclusion Criteria:

1. Have not received systematic English learning in high school;
2. Have not taken the CET-4 exam in December;
3. Participated in but failed to pass the December CET-4 exam.

Withdraw Criteria: Subject voluntarily withdraw informed consent.

【Duration】

The study you participate will last for 2 years.

【Obligation】

During the study, you will need to provide information such as your age, gender, high school majors (Science or Art), college entrance examination English score and English final test scores, CET4 and CET6 scores. You need to participate in English teaching activities on time and complete learning tasks as required.

【Risks】

It's possible that you find it difficult to get used to the new teaching methods.

【Benefits】

You will probably benefit from this study, because you will have the opportunity to communicate with classmates and teachers online in a timely manner during the learning process, learn more flexibly in terms of time and methods, and participate in group cooperation, which is helpful to cultivate the team work spirit and develop self-directed learning habits.

【Cost】

The research process does not require you to pay any fees and does not provide any grants. The costs incurred by the research are borne by the researchers.

【Compensation for related injuries】

If damage occurs during the study and the authority stipulated by national laws and regulations determines that the project team needs to bear corresponding responsibilities, we will provide you with free treatment and compensate in accordance with national laws and regulations.

【Withdraw halfway】

You can choose not to participate in the study, or notify the project team to withdraw from the study at any time, your data will not be included in the study results, and any of your treatment and rights will not be affected as a result.

【Privacy and confidentiality】

Your participation in the study and personal data during the study are confidential. Your samples will be identified by number rather than name. Information that can identify you will not be disclosed to members outside the research group unless we have your permission. Your file is only available for inspection by the investigators. In order to ensure that the research is carried out in accordance with the regulations, if necessary, members of the management department or the ethics committee can access your personal data as required. No personal information will be

disclosed when the results of this study are published.

If you need further information about the materials during the research process, or if you have suffered research-related injuries, please contact researcher Yanan Tao at 18943659752.

【Declaration of Consent】

I have read this informed consent.

I have the opportunity to ask questions and all of them have been answered.

I understand that participation in this study is voluntary.

I can choose not to participate in this study, or withdraw at any time without discrimination or retaliation after notifying the researchers, and any of my treatment and rights will not be affected as a result.

I agree to participate in this study and receive a signed copy of the Informed Consent.

Name (Block letters) : _____

Tel: _____

Date: