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The Impacts of Adopting Blended Learning Models on the Learning Efficiency of College Students in Teacher Training Institutions

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Abstract

Blended learning, an integration of traditional face - to - face and online learning, has gained significant attention in education. Teacher training institutions, vital for shaping future educators, struggle with traditional teaching issues like low classroom efficiency. This study delves into how blended learning impacts students' learning efficiency in these institutions.Two research questions guide the study. One, to what degree does blended learning enhance students' academic performance compared to traditional methods? Two, how does it influence students' motivation, classroom participation, and learning efficiency, and thereby boost academic achievement?Adopting a descriptive research methodology , questionnaires will be administered to first - to fourth - year Chinese Language and Literature majors in Yunnan's teacher training colleges. Quantitative analysis will uncover the correlation between blended learning and academic achievement. The findings aim to provide a theoretical basis for teaching reform, elevate the quality of teacher - training students, and offer educators a comprehensive understanding of blended learning's application outcomes.

Keywords: Blended Learning Model, Teacher Training Colleges, Learning Efficiency, Academic Achievement, Teaching and Learning Reforms

Introduction

Research Background

Teacher educators need to master professional knowledge and teaching skills, and also possess innovative thinking and a strong educational sense to meet the diverse challenges of future education. Teacher training institutions shoulder the significant mission of cultivating prospective educational elites. They have been constantly exploring and innovating teaching modalities to contribute more outstanding educators to China's and the global educational causes, promoting the prosperity and development of education.

The traditional teaching model has accumulated rich experience over time. Its core value lies in building a solid foundation for students, aiming to train a group of “prospective teachers” who meet specific standards. This is of great significance for steadily improving the quality of basic education in China and the sustainable development of education as a whole.

With the rapid development of information technology, the education field is undergoing profound changes. The blended teaching mode, which combines traditional face - to - face teaching and online learning, has gradually gained extensive attention in the education sector. As the cradle of future teachers (Xu, 2024), the teaching quality and efficiency of teacher training colleges directly affect the quality of future education.

Problem Statement

Currently, classrooms using the traditional teaching mode face issues such as low efficiency and slow improvement in students' academic achievement. At the student level, some teacher trainees have low motivation to attend lectures, limited interactive participation, and low learning efficiency. This may be due to both low motivation and inappropriate learning methods. In the long run, this not only affects students' professional knowledge accumulation and ability improvement but may also perpetuate this inefficient pattern in future teaching, potentially influencing the quality of basic education.

From the teacher's perspective, although they strive to improve teaching quality, they are restricted by traditional teaching methods or their own teaching skill limitations. This often makes it difficult to effectively stimulate students' learning interest and potential, resulting in limited improvement in classroom efficiency and academic achievement.

Research Objectives and Scope

Exploring the application of the blended teaching mode in teacher training colleges and its impact on students' learning efficiency is crucial for promoting teacher education reform and improving the quality of teacher - training students. This study aims to answer two research questions:

(1) How does the application of the blended learning model compare with traditional teaching methods in improving students' academic achievement in teacher training institutions?

(2) How does blended learning influence students' motivation, classroom engagement, and learning efficiency, and thereby enhance academic achievement?

Literature Review

This study constructs a comprehensive theoretical framework to explore how the Blended Learning Model enhances students' Academic Achievement from multiple theoretical perspectives. The framework integrates the ARCS Motivation Model (Keller, 1987), Constructivism Learning Theory (Piaget, 1970; Vygotsky, 1978), the Community of Inquiry (CoI) Framework (Garrison et al., 2000), and the combination of Self - Determination Theory (SDT) and Technology Acceptance Model (TAM) (Deci & Ryan, 1985; Davis, 1989).As shown in Figure1.

Specifically, the ARCS Model focuses on how the interactive activities and multimedia elements in blended learning stimulate students' Motivation. It promotes learning engagement by attracting attention, enhancing relevance, building confidence, and providing satisfaction. The Constructivism Theory emphasizes how the blended learning model, which combines online self - study and face - to - face collaboration, improves Learning Efficiency. It supports the active construction of knowledge through social interaction and contextualized experiences. The CoI Framework further explains how online forums, social presence, and teacher - led activities in blended learning enhance Classroom Engagement, thus deepening

cognitive presence and teaching presence. SDT and TAM focus on how the flexibility of blended learning, adaptable resources, and the perceived ease - of - use and usefulness of technology shape Student Perceptions of learning tools, thereby influencing their intrinsic motivation and behavioral intention.

These theories are intertwined, all pointing to how blended learning, through the synergistic effects of motivation, efficiency, engagement, and perception, ultimately improves students' Academic Achievement. This provides a theoretical basis and empirical evidence for educational practice.

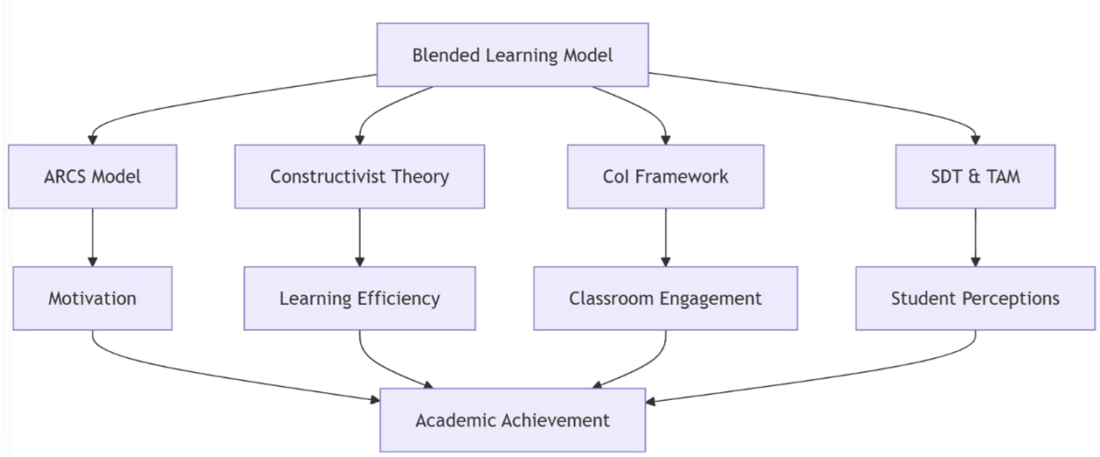

Figure 1 Theoretical Framework

Blended Learning in China

Traditional teaching methods, usually teacher - centered, emphasize one - way knowledge transfer and standardized tests, which have certain limitations. Blended learning breaks this single - path knowledge transmission by integrating rich online educational resources with offline teacher guidance and supervision. Online resources offer multiple perspectives, diverse cases, and interdisciplinary knowledge integration, broadening students' learning horizons and cultivating their independent learning and exploration abilities. In the classroom, teachers can conduct targeted Q&A, interactive discussions, and in - depth knowledge mining activities based on students' online learning feedback, enhancing the depth and precision of education.

The blended teaching mode has become essential. By integrating traditional classroom teaching and online learning content, universities can modernize their teaching concepts and methods, effectively attracting students and improving learning outcomes. Although some conservative educational authorities and traditionalists still support the traditional face - to - face lecture - based classroom model, recent advancements in blended instructional methodologies highlight the need for innovative teaching reforms to meet the changing requirements and challenges in the education field (Ji et al., 2023).

Research shows that blended learning models increase student motivation by making classes more vivid and engaging through the integration of multimedia elements and online teaching resources (Nie, 2023). For example, in the blended teaching of Chinese language and literature at a university, the instructor used the MOOC online platform to enable students to

access teaching resources anytime and anywhere, while face - to - face classroom discussions enhanced student participation and interaction. McDermott and Zerr (2019) argued that the blended learning model helps students flexibly utilize various learning resources at different learning stages, improving learning efficiency. Their empirical study found that students adopting blended learning demonstrated higher knowledge mastery and stronger application skills in the final exam (Bunari & Sudirman, 2024). The blended learning model also provides more interactive opportunities for instructors and students through online - offline combinations. On the online platform, students can ask questions, participate in discussions, and communicate freely. Meanwhile, teachers can conduct targeted Q&A, interactive discussions, and in - depth knowledge mining activities in the classroom based on students' online learning feedback, strengthening teacher - student communication and interaction. Additionally, the hybrid model can track students' learning progress through quantitative data analysis, providing more targeted teaching support.

Academic Achievement

Blended learning, which combines traditional face - to - face instruction with online learning, has a positive and significant impact on student academic achievement across disciplines. Research indicates that student outcomes, such as test scores and overall course performance, are generally better in blended learning environments compared to traditional classroom instruction. This improvement in academic achievement has been observed in fields like public health, math education, chemistry, and engineering (Kiviniemi, 2014; Ceylan & Kesici, 2017). Even in business, blended e - learning has enhanced academic achievement by integrating traditional teaching methods with online learning (Dhiman & Gera, 2021). Similarly, in a cardiovascular pharmacotherapy course, blended learning was associated with increased student satisfaction and perceived learning influence, leading to improved academic achievement (McLaughlin et al., 2015).

During the COVID - 19 pandemic, the flexibility and personalized learning opportunities offered by blended learning became increasingly important. The ability to switch between online and offline education modes allows students to engage with educational content at their own pace (Elias et al., 2021). This adaptability of blended learning is widely recognized by academics as a key factor in supporting student performance and academic achievement in challenging environments.

In summary, research supports the effectiveness of blended learning in improving academic achievement across different disciplines and educational settings. By combining the advantages of traditional instruction and online learning tools, blended learning offers a versatile and impactful approach to enhancing student achievement.

Learning Efficiency

Compared to traditional face - to - face instruction, blended learning is increasingly being promoted for its potential to enhance student learning experiences and outcomes. Research shows that blended learning can motivate students to learn and enable them to understand the material more deeply (Paudyal, 2022). The ARCS model (Attention, Relevance, Confidence, and Satisfaction Model, proposed by American educational psychologist John M. Keller) evaluation (Ma & Lee, 2021) found that blended learning increases student motivation and learning efficiency. This study emphasized the importance of considering both instructor and

student perspectives when designing blended courses to optimize student learning outcomes. Blended learning also allows for personalized instruction and data - driven decision - making. In addition, the use of quizzes in blended learning moderates the learning experience. Although blended learning may be more challenging than traditional educational methods, it is ultimately more effective (Spanjers et al., 2015).

During the COVID - 19 pandemic, comparisons between virtual and blended learning approaches revealed students' perceptions and experiences, providing valuable insights into the effectiveness of different instructional models (Finlay et al., 2021). The implementation of blended learning offers a more diverse learning experience than traditional face - to - face instruction, increasing student engagement in science courses (Lavenia, 2023). Blended learning has several advantages, including promoting independent and collaborative learning, improving learning outcomes, creating communities of inquiry, and increasing student satisfaction with the instructional model (Ryane & Faddouli, 2020). Combining traditional classroom instruction with online self - directed learning, blended learning redefines the traditional teaching and learning model, aiming to motivate students, arouse their learning interest, and ultimately improve learning outcomes. In conclusion, research on blended learning highlights its potential to revolutionize the educational landscape by providing flexible, engaging, and effective learning environments that meet the diverse needs and preferences of students. By leveraging the strengths of both traditional and online learning models, blended learning emerges as a promising pedagogical approach to enhance student learning outcomes and classroom experiences.

Proposed Methodology

Conceptual Framework

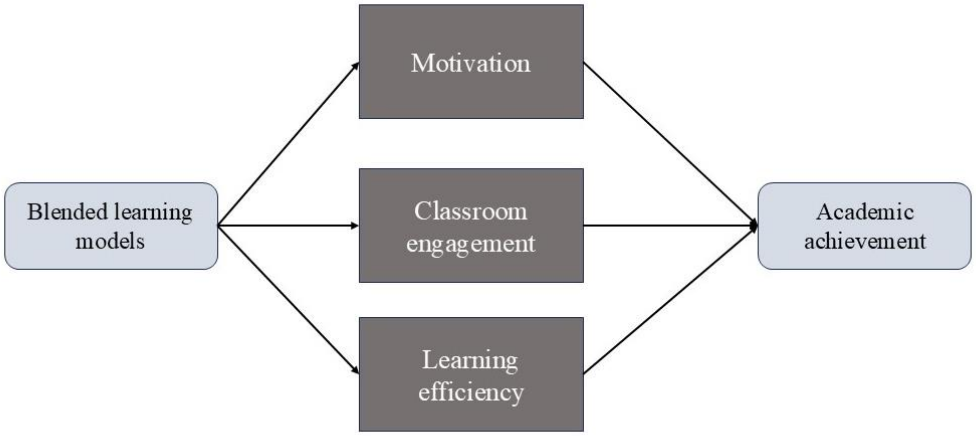

Figure 2 Conceptual Framework

Based on the proposed conceptual framework,This concept paper adopts a empirical study exploring the specific effects of the blended learning model on students' motivation, classroom engagement, learning efficiency, and academic achievement in teacher training colleges, as shown in figure2. For this study, it is recommended to collect data related to students in teacher training colleges under the blended learning model through quantitative methods. The quantitative approach is preferred because it can precisely reveal the

relationship between blended learning and students' academic achievement. It also enables the researcher to quantitatively analyze the relationships among motivation, classroom engagement, learning efficiency, and academic achievement (Creswell, 2012). Moreover, quantitative research allows the researcher to collect data from a specific group of students in a teacher education institution within a limited time frame, as this study focuses on students' current learning environment rather than their historical backgrounds, personal profiles, or future development.

Research Population and Samples

This study adopts a descriptive research methodology, as defined by Atmowardoyo (2018), to describe the current status, influence, and effects of the blended learning model's application on key indicators of undergraduate students in teacher training institutions. The core objective of this methodology is to lay the foundation for subsequent analysis. Quantitative research will be employed, as quantitative data is essential for revealing general patterns and characteristics of large - scale populations. Following Creswell's (2014) argument that objective theories are validated by exploring associations between multiple variables, in this study, quantitative data such as instrument scores will provide precise statistics. These statistics will enable the researcher to quantify and analyze the frequency and magnitude of trends using statistical analysis techniques (Cohen et al., 2017).

In the quantitative study, a questionnaire research design is recommended to systematically collect data on key indicators such as the learning efficiency of teacher - training students after using the blended learning model. This approach is cost - effective as it can systematically, comprehensively, and effectively collect opinions (Salkind, 2012).

Suggested Research Procedures

Step 1: Identify the Research Population

The research population consists of students in teacher - training colleges across Yunnan Province, China. Yunnan Province is a relatively underdeveloped region in China, and many areas within the province face educational development challenges, especially in economically disadvantaged counties where there is a shortage of teaching staff, making it difficult for students to access quality education.

To address this issue, eight teacher - training colleges have been established in Yunnan Province. Each year, approximately 20,000 teacher - training students graduate from these colleges, aiming to be dispatched to underdeveloped basic education regions. However, numerous studies in this region have reported that teacher - training students have problems with learning efficiency and initiative, which may prevent them from fully and firmly acquiring the knowledge and skills necessary for teaching.

Step 2: Determine the Research Sample

Purposive sampling will be used for sample selection. Purposive sampling is a method where the researcher selects a sample according to specific pre - established criteria or purposes. It focuses on the sample's suitability for the research purpose rather than its representativeness or randomness. Unlike probability sampling, this method relies on the researcher's judgment to select a subset of the population with specific information that can meet the study's goals. As Billups et al. (2021) stated, this type of sampling enhances the researcher's ability to obtain

relevant data. They further explained that purposive sampling requires the intentional and discerning selection of participants relevant to the research topic, who have knowledge or experience related to the phenomenon under investigation.

Based on this, the researcher will select students majoring in Chinese Language and Literature in teacher - education programs. The selected students should be from freshmen to seniors and currently enrolled in a teacher - education university in Yunnan Province. This sampling method ensures that the selected sample is closely related to the research focus and can provide valuable and context - specific insights for the study.

According to Cooper and Schindler (2011), the appropriate number of participants for a pilot study is 25 - 100. It is recommended to identify a pilot institution and select 80 teacher - education students from it as the research sample for the initial questionnaire testing. Prior consent must be obtained from both the pilot school and the participants to ensure ethical research practices and the validity and reliability of the sample selection process.

Step 3: Choose the Type of Data Collection Method

a. Students' learning achievement data will be collected through their class teachers. This can be done using third - party applets or APPs for data input, or by using Excel to count various data indicators. It is important to collect and export the data in a timely manner for analysis. The achievement data includes sources such as usual homework grades, quizzes, supporting exercises, and final exam grades.

b. A questionnaire will be used to collect data on students' motivation, classroom engagement, and learning efficiency in the blended learning model. The questionnaire items are adapted from Lin's (2016) “Design and Implementation of Blended Teaching Model Based on Flipped Classroom” survey. Due to project and local cultural differences, the items need to be modified to ensure that the data collected can answer the established research questions.

The questionnaire will be designed as a six - part instrument with 30 questions covering basic information, experience with the model, motivation, classroom engagement, learning efficiency, and open - ended questions. This design aims to collect data on students' perceptions of the model, motivation, classroom engagement, and learning efficiency. To ensure the validity and reliability of the instrument, the theoretical framework and survey purpose will be clarified, the questionnaire items will be rationalized, pre - testing and revision will be conducted, and reliability tests will be performed.

Before distributing the questionnaire to the respondents, the researcher will refine and test it. Then, the instrument will be pilot - tested among 80 students who are generally representative of the study population.

Step 4: Administer Data Collection

It is estimated that it will take participants about 10 - 15 minutes to complete the questionnaire. After the participants finish the questionnaire, the researcher will organize and export the data into Excel, CSV, and other formats for easy follow - up analysis.

The researcher will use statistical analysis to deeply explore the patterns and trends in the data, aiming to provide educational practitioners with a comprehensive and objective description and understanding of the effectiveness of the blended learning model.

Ethical Considerations

Ethical considerations are of utmost importance during the data collection process. The researcher must ensure respect for individuals and the research site. Before using the research instrument, the researcher should obtain informed consent from all participants and distribute informed consent forms to ensure that participants are fully informed and give their consent voluntarily.

Validity and Reliability

Reliability Test

a. Retest Reliability

Select a representative part of the respondents as the retest sample. Stratified sampling can be used according to factors such as gender and grade to ensure the inclusion of different types of respondents.

Determine an appropriate time interval. The choice of time interval should consider factors like the nature of the study content and the respondents' memory characteristics. For relatively stable measures of knowledge or attitudes, the time interval can be longer, such as weeks or months. For content affected by short - term factors, the time interval should be shorter.

Conduct separate tests at two different times to collect data.

Calculate the correlation coefficient between the two test results using a statistical method, such as the Pearson correlation coefficient. A higher correlation coefficient indicates better retest reliability. Generally, a correlation coefficient greater than 0.7 suggests that the questionnaire has good stability.

b. Internal Consistency Reliability

Import all questionnaire data into SPSS23.0 for analysis. Use Cronbach's Alpha coefficient to test the internal consistency of the questionnaire, ensuring a high degree of consistency and stability among the responses to each question. The Cronbach's Alpha coefficient ranges from 0 to 1. A higher coefficient indicates better internal consistency. Generally, a coefficient of 0.7 or above indicates that the questionnaire has good internal consistency and stability. If the coefficient is low, consider adjusting the questionnaire questions, such as deleting questions with low relevance to others or modifying the question expressions to more accurately reflect the study's core concepts.

Validity Test

a. Content Validity

Invite experts in the fields of teaching models, blended learning, and educational technology to review the questionnaire. These experts should have rich knowledge and experience in related areas. They will review the questionnaire content one by one according to the study purpose, theoretical framework, and research questions to determine whether each topic is relevant to the research and can effectively measure the relevant variables.

Conduct pre - testing. Administer the questionnaire in a small area, such as a classroom or a small group of teachers, to collect feedback. Check whether the respondents' understanding of the questionnaire questions is as expected and whether there are ambiguous or misleading questions.

Revise and improve the questionnaire content based on the expert review and pre - testing feedback. Delete irrelevant or inappropriate questions, modify unclearly stated questions, and add questions that can better cover the study variables to ensure the content validity of the questionnaire.

b. Construct Validity
Use statistical software for factor analysis. Enter the questionnaire data into the software and extract potential factors or dimensions through principal component analysis or other factor analysis methods.

Check the loading of each question item on the corresponding factor. A higher loading value indicates a stronger correlation between the item and the factor it belongs to, and a more effective reflection of the latent variable. Usually, a loading value greater than 0.4 or 0.5 is considered ideal.

Through confirmatory factor analysis, assess whether the logical relationship between dimensions is reasonable. For example, compare whether the correlations between different dimensions are in line with theoretical expectations and whether there is excessive crossover or overlap. Based on the analysis results, adjust the questionnaire structure, such as reclassifying dimensions, merging or deleting certain question items, etc., to improve the construct validity.

c. Criterion - Related Validity
Select appropriate external validity standards. For example, when measuring learning effects, students' language test scores, regular homework scores, and classroom performance evaluations can be chosen as validity standards; when measuring learning interest, students' independent learning time and enthusiasm for participating in classroom discussions can be used as validity standards.
Collect questionnaire data and validity data, ensuring the accuracy and completeness of the data.

Calculate the correlation coefficient between the questionnaire results and the validity data through correlation analysis and other methods. If the correlation coefficient is significant, it indicates that the questionnaire has good criterion - related validity and can reflect the real influence of the blended learning model on learning effects and other variables. For example, if there is a significant positive correlation between the scores on the “Increased interest in learning” dimension of the questionnaire and the time students spend on independent language learning, it means that the questionnaire can effectively measure the influence of the blended learning model on learning interest to a certain extent.

Suggested Research Analysis

The data collected in this study will be processed and analyzed using SPSS 23.0 to comprehensively evaluate the impact of the blended teaching and learning mode on the learning efficiency of students in teacher training colleges. The steps and methods of data analysis are as follows:

Data Collection Aspect

As mentioned above, students' learning achievement data is collected through class teachers, which can be achieved by using third - party applets, APPs for input, or by using Excel for index statistics. This achievement data comes from multiple sources, including usual homework grades, quizzes, supporting exercises, and final exam grades. Data on students' learning motivation, classroom participation, and learning efficiency in the blended learning mode are collected through questionnaires.

Reliability and Validity Tests

Reliability Testing: The Cronbach's alpha coefficient is used to examine the internal consistency of the questionnaire, ensuring a high degree of consistency and stability in the responses to each question item within the questionnaire.

Validity Testing: Structural validity is tested through factor analysis. This process is designed to evaluate whether the dimensions can accurately reflect the specific variables related to the blended learning model. The content validity of the questionnaire is ensured through expert review and pre - testing procedures.

Data Analysis Methods

Descriptive statistics are recommended to summarize the survey responses and achievement data. This can visually present the distribution of the data, such as the mean and standard deviation.

Inferential statistics (e.g., ANOVA and t - tests) are used to analyze differences in achievement between groups, determining whether there are significant differences in student achievement between the blended learning model and the traditional teaching model.

Emphasis is placed on conducting correlation analyses (e.g., Pearson's correlation coefficient) to quantify the strength and direction of the linear relationship between learning efficiency and other variables by calculating the correlation coefficient. For example, if the Pearson correlation coefficient is close to +1, it indicates a strong positive correlation between the two variables; close to -1 indicates a strong negative correlation; and close to 0 indicates a weak correlation.

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