ISSN 2522-6398 Vol. 8, Issue 5: 143-148, DOI: 10.25236/FER.2025.080521

Blended Online-Offline Teaching in Higher Education: Insights, Key Factors, and Optimization Strategies

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Abstract: *This study focuses on blended online-offline teaching in higher education, integrating multiple survey data and related research to analyze its current application, key factors influencing student satisfaction, and propose targeted optimization strategies. Findings indicate that course design, teacher-student interaction, and platform functionality significantly impact teaching effectiveness. Accordingly, recommendations are proposed, including improving course design, enhancing teacher-student interaction, optimizing platform development, and refining evaluation systems to elevate the quality of blended teaching and advance educational development in higher education.*

Keywords: *Higher Education; Blended Online-Offline Teaching; Student Satisfaction; Teaching Optimization*

1. Introduction

Amid the rapid advancement of educational informatization, blended online-offline teaching has emerged as a pivotal direction for higher education reform. The issuance of the Guiding Opinions on Organizing and Managing Online Teaching in Higher Education Institutions During the Epidemic Prevention and Control Period has spurred universities to actively explore blended teaching models. With the deepening of the "Internet + Education" strategy, blended teaching has gained widespread adoption in higher education. According to the 55th Statistical Report on China's Internet Development by the China Internet Network Information Center (CNNIC), as of December 2024, China's internet user base reached 1.108 billion, with an internet penetration rate of 78.6%. This vast user base has fueled the vigorous growth of online education.

Data projections estimate that by 2024, the user base for digital education in China will reach 423 million, marking significant growth compared to previous years. This large-scale user base provides a solid foundation for the comprehensive implementation of blended teaching. On one hand, the rich learning data generated by massive user groups, combined with cutting-edge technologies such as big data analytics and artificial intelligence, enables precise insights into students' learning habits, preferences, and knowledge mastery. This data supports teachers in optimizing online and offline course content and adjusting teaching strategies flexibly to achieve personalized and precise education. For instance, by analyzing metrics such as students' dwell time on specific knowledge points, frequency of revisiting content, and quiz accuracy, teachers can identify learning difficulties and tailor in-class instruction accordingly. On the other hand, this large user base fosters diverse and dynamic learning communities. Learners from different regions, backgrounds, and needs converge to interact, share resources, and exchange experiences, creating a positive learning atmosphere. For example, in programming learning communities, students collaborate to discuss coding approaches and troubleshoot technical challenges. This fosters engagement, broadens perspectives, and enhances collaboration and innovation skills, thereby driving the continuous evolution of blended teaching.

However, blended teaching faces challenges in practice, including fluctuating student satisfaction and inconsistent teaching outcomes. Therefore, in-depth research into blended teaching in higher education and the exploration of effective strategies to enhance teaching quality hold significant practical importance. Drawing on the strategies for constructing and applying for national first-class undergraduate courses shared by scholars such as Professor Fu Gangshan and Professor Zeng Lijuan, combined with the findings of this study, universities can better clarify the direction and priorities of blended course

ISSN 2522-6398 Vol. 8, Issue 5: 143-148, DOI: 10.25236/FER.2025.080521

development, thereby increasing the success rate of course applications [1,2].

2. Current Application of Blended Online-Offline Teaching in Higher Education

2.1 Implementation of Teaching Models

Blended teaching in higher education primarily leverages Massive Open Online Courses (MOOCs) and other online teaching resources. Professor Fu Gangshan emphasized the importance of understanding the essence of first-class undergraduate courses, outlining construction strategies and implementation methods, and sharing practical experiences [1]. Yang Zhenhua and others conducted a survey to evaluate the overall state of blended teaching in universities, identifying its advantages and shortcomings [3]. Some courses integrate online theoretical learning with offline practical applications. For instance, in the Web Front-End Development Technology course, students learn foundational concepts online and engage in project-based practice offline. Other courses adopt a three-stage model of "pre-class online preview, in-class focused instruction, and post-class online reinforcement," as highlighted in Yang Tian's study, enabling seamless knowledge transfer and internalization [4]. Xuan Qilin's research on blended English teaching models in higher education offers insights for other disciplines, suggesting adaptable classroom blending methods [5].

The data for this study primarily originate from a survey on the application of blended online-offline courses at the School of Economics and Management, Hubei University of Automotive Technology, conducted via electronic questionnaires, with a total of 471 valid responses collected. Survey data on the proportion of courses with online teaching components during university studies reveal a wide distribution (see Table 1). This indicates varying degrees of online teaching integration across universities, suggesting that blended teaching remains in an exploratory phase without a standardized, mature model.

Table 1: Proportion of Courses with Online Teaching Components in University Studies

Option	Count	Percentage
Very Few	7	1.49%
10%	46	9.77%
20%	91	19.32%
30%	127	26.96%
40%	86	18.26%
50%	67	14.23%
60%	22	4.67%
70%	10	2.12%
80%	7	1.49%
90%	3	0.64%
100%	5	1.06%
Total Responses	471	

2.2 Student Satisfaction with Blended Teaching

Regarding satisfaction, aggregated data show varying levels of student satisfaction with online teaching (see Table 2). While most students view online teaching positively, a notable portion express dissatisfaction, highlighting significant room for improvement in enhancing blended teaching quality and addressing student needs.

Table 2: Overall Satisfaction with Online Teaching

Option	Count	Percentage
Very Satisfied	250	53.08%
Neutral	217	46.07%
Dissatisfied	4	0.85%
Total Responses	471	

2.3 Uses and Perceived Advantages of Online Teaching

Online teaching serves multiple purposes, with students identifying its primary uses as previewing knowledge, reviewing content, and learning skills of interest (see Table 3). This underscores the critical

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role of online teaching in facilitating autonomous learning by providing diverse resources and flexible learning modes.

Table 3: Distribution of Online Teaching Uses

Option	Count	Percentage
Previewing Knowledge	323	68.58%
Replacing In-Person Teaching	78	16.56%
Post-Class Review	293	62.21%
Exam Preparation (e.g., Postgraduate, Civil Service)	140	29.72%
Learning Foreign Languages	116	24.63%
Learning Skills of Interest	263	55.84%
Other	131	27.81%
Total Responses	471	

For students in economics and management disciplines, perceived advantages of online teaching include convenience, time efficiency, rich learning resources, low cost, diverse learning methods, and enhanced self-learning capabilities (see Table 4). These advantages highlight the potential of online teaching in such disciplines and offer insights for other fields.

Table 4 Perceived Advantages of Online Teaching in Economics and Management Disciplines

Option	Count	Percentage
Convenience and Time Efficiency	406	86.2%
Rich Learning Resources	329	69.85%
Low Learning Cost	314	66.67%
Diverse Learning Methods and Self-Learning Enhancement	334	70.91%
Mitigation of Environmental or Epidemic Disruptions	264	56.05%
Total Responses	471	

3. Key Factors Influencing the Effectiveness of Blended Teaching

3.1 Course Design Quality

Course design is a critical determinant of blended teaching effectiveness. Effective course design delineates clear divisions and connections between online and offline content, aligning with course objectives and student characteristics. Content suited for autonomous learning, such as foundational knowledge or preliminary case analyses, should be delivered online, while content requiring deep interaction or hands-on practice, such as group discussions or experiments, should occur offline. Qu Kai's research indicates that the integration of course content and the seamlessness of teaching activities significantly affect student satisfaction, with satisfaction dropping notably when online-offline alignment falls below 75% [6].

In practice, some courses suffer from redundant or disconnected online and offline content, diminishing learning outcomes. For example, some online videos merely replicate offline lectures without tailored design, failing to meet students' online learning needs, while offline sessions often underutilize online learning outcomes, lacking depth and innovation. Additionally, assessment methods must align with blended teaching models, comprehensively evaluating online participation, assignment completion, exam performance, and offline engagement to holistically assess student learning.

3.2 Teacher-Student Interaction Frequency

Teacher-student interaction is pivotal in blended teaching, fostering student engagement, participation, and deep learning. Smith et al.'s longitudinal study across multiple universities found a significant positive correlation between student satisfaction and the frequency of teacher feedback in blended models ($r = 0.42$, $p < 0.01$) [7]. Surveys also reveal that teacher feedback on assignments enhances learning and correlates positively with students' willingness to continue blended courses ($r = 0.471$).

However, challenges persist. Online teaching's spatial separation hinders real-time monitoring of student progress, limiting timely and sufficient interaction. Some teachers lack effective interaction

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strategies, failing to actively guide discussions in forums or other platforms. Additionally, students' varying levels of engagement impact interaction quality, with some lacking the confidence to actively participate.

3.3 Platform Functionality and Technical Support

Platform functionality and technical support are foundational to successful blended teaching. Stable platforms, user-friendly interfaces, and robust features enhance the learning experience and teaching outcomes. Yang Tian's study identifies platform stability, interface usability, and mobile compatibility as critical technical factors, noting that response times exceeding three seconds trigger negative emotions in 42% of students [4].

In practice, technical issues such as lagging or disconnections during live streams or playback disrupt learning. Complex platform interfaces increase the learning curve, while limited functionalities—such as basic interaction tools or inaccurate data tracking—fail to meet teaching needs. Network instability further hampers online learning, particularly in areas with poor connectivity.

3.4 Student Self-Regulated Learning Ability

Students' self-regulated learning ability significantly influences blended teaching outcomes. Zhou Weili's empirical study confirms a strong positive correlation between self-regulated learning ability and blended teaching satisfaction ($r = 0.68$, $p < 0.01$). Online learning demands robust self-regulation, including time management, learning planning, and resource selection.

However, some students lack these skills, struggling to navigate abundant online resources and feeling overwhelmed. Others exhibit low motivation or discipline, failing to complete tasks on time. Additionally, external distractions and poor self-management further undermine learning effectiveness.

4. Strategies for Optimizing Blended Teaching in Higher Education

4.1 Enhancing Course Design and Content Quality

Universities should prioritize scientific and systematic course design, aligning online and offline content with course objectives and student needs [8]. Theoretical courses may emphasize online delivery through videos and digital resources for foundational learning, while practical courses should focus on offline sessions for hands-on skill development. Seamless integration of online and offline content is essential to avoid redundancy or disconnection.

Course content should be practical and up-to-date, incorporating the latest research and real-world cases [9]. For example, computer science courses must cover emerging programming languages, frameworks, and applications to equip students with cutting-edge skills. Assessment systems should be diversified, evaluating online participation, assignments, classroom performance, and group projects to comprehensively gauge learning outcomes.

4.2 Strengthening Teacher-Student Interaction for a Positive Learning Environment

Teachers must adopt a proactive approach to interaction, leveraging online and offline channels such as discussion forums, live Q&A sessions, and in-class group discussions. Timely responses in forums and encouraging student questions during live sessions foster engagement. Innovative methods, such as case-based teaching, problem-based learning, and project-based learning, can enhance participation by involving students in real-world problem-solving, boosting analytical and collaborative skills.

Teachers should also address individual student needs, offering extra support to those facing difficulties to encourage active participation and improve learning outcomes.

4.3 Optimizing Platform Development for Robust Technical Support

Universities should invest in enhancing online teaching platforms, prioritizing stability, user-friendly interfaces, and mobile compatibility. Platforms must minimize technical disruptions, simplify navigation, and support seamless mobile access. Expanding interactive features—such as online polls, quizzes, and collaborative tools—can enhance engagement and teaching dynamism.

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Data security is critical to protect user information, and dedicated technical support teams should promptly address platform issues to ensure uninterrupted teaching and learning.

4.4 Fostering Students' Self-Regulated Learning Ability

Universities should cultivate students' self-regulated learning skills by fostering a positive learning mindset and teaching effective strategies, such as creating study plans, selecting quality resources, and self-assessing progress. For instance, teachers can guide students in setting realistic goals based on course syllabi and encourage reflective practices to refine learning strategies.

Institutions can offer workshops or seminars on self-regulated learning and organize peer-sharing sessions to exchange study tips, collectively enhancing students' autonomy and learning effectiveness.

4.5 Establishing a Diversified Evaluation System

A comprehensive evaluation system is vital for assessing blended teaching effectiveness, covering teaching quality, student outcomes, and platform performance [10]. Teacher evaluations should integrate student feedback, peer reviews, and expert assessments to gauge teaching proficiency. Student evaluations should consider online engagement, assignment quality, classroom participation, and group project outcomes to holistically assess learning.

Platform evaluations should focus on stability, functionality, and user experience, identifying areas for improvement. A diversified evaluation system provides robust evidence to guide teaching enhancements.

5. Conclusion

Blended online-offline teaching is an inevitable trend in educational informatization, critical for enhancing teaching quality and meeting diverse student needs. Analysis of its current application and key influencing factors reveals challenges in course design, teacher-student interaction, platform functionality, and student self-regulation, which impact teaching effectiveness and satisfaction. Proposed strategies include refining course design, strengthening interaction, optimizing platforms, fostering self-regulated learning, and establishing diversified evaluations.

Moving forward, universities should continue innovating and refining blended teaching models to leverage the strengths of online and offline approaches, ultimately enhancing teaching quality and cultivating talent suited to modern demands. Ongoing research should provide robust theoretical and practical guidance to support the evolution of blended teaching.

Acknowledgements

Hubei University of Automotive Technology 2024 University-Level Teaching Reform Research Project, JY2024032: Research on Curriculum System Construction for the Big Data Management and Application Program under the Background of the New Liberal Arts;Hubei University of Automotive Technology 2023 University-Level First-Class Undergraduate Course Construction Project (Blended Online and Offline Teaching), XYLK2023015: Online Marketing;Industry-University Collaborative Education Project of the Ministry of Education of Hubei University of Automotive Technology, 231104615154521: Construction of the Big Data Teachers' Workshop.

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