



A Study on Satisfaction with the Blended Teaching Model for Financial Big Data Courses in Chinese Vocational Colleges

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Abstract. This study examines the satisfaction levels of Chinese vocational college students regarding the blended teaching model employed in financial big data courses. Through a questionnaire survey and the application of partial least squares structural equation modeling (PLS-SEM), this research investigates its impact on student satisfaction (S) across three dimensions: learning (L), teaching (T), and Course (C). The findings indicate that positive learning attitudes and behaviors (LA&LB), effective teaching methods (TM), and well-structured course content significantly enhance students' satisfaction with the blended learning model. Among the various factors, the impact of TM stands out significantly. Furthermore, an exceptional platform design (PD) substantially enhances the learning experience. Based on the data presented, this study not only confirms the correlation among various factors but also proposes specific recommendations to enhance the blended learning model of financial big data courses in vocational institutions. The findings of this research hold significant implications for advancing educational technology and improving teaching quality.

Keywords: Blended Learning, Financial Big Data Course, Satisfaction, Vocational Education

1 Introduction

With the rapid advancement of information technology, the education sector is experiencing significant transformations [1][2]. This is particularly evident in higher education, where Blended Learning—a pedagogical approach that integrates the strengths of traditional face-to-face instruction with contemporary online learning—has increasingly garnered widespread attention [3][4]. This model not only leverages the advantages of information technology but also preserves the valuable experiences derived from direct interaction, positioning it as an effective and adaptable teaching approach.

In China's vocational colleges, the instruction of financial big data courses encounters distinct challenges. These courses necessitate that, students not only grasp theoretical concepts but also develop a range of skills, including data analysis and proficiency in application software [5][6]. Consequently, enhancing students' learning outcomes and satisfaction through effective teaching methodologies has emerged as a significant area of research [7][8].

Previous research has demonstrated that positive learning attitudes and behaviors, effective teaching methods, and well-structured course content significantly enhance students' satisfaction with blended learning environments [9][10][5][7]. Furthermore, effective platform design is a crucial element in enhancing the learning experience [1][2]. Nevertheless, while blended learning offers numerous advantages, its practical effectiveness remains contingent upon the successful integration of various factors [3].

The Financial Big Data course teaching platform represents a blended learning environment that integrates both online and offline educational content. By leveraging the strengths of traditional face-to-face instruction alongside digital learning modalities, it offers a flexible and adaptable educational experience. This platform features an intuitive user interface and encompasses functional modules for course management, learning tracking, interactive communication, and evaluation systems. It ensures cross-platform compatibility and accessibility to enhance user engagement. Furthermore, the platform facilitates real-time interaction and collaborative learning opportunities while employing a distributed architecture to guarantee high availability without compromising data security.

The objective of this study is to investigate the satisfaction levels of Chinese vocational college students regarding the blended learning model employed in financial big data courses. This analysis examines how three dimensions—L, T, and C—interact to influence students' overall S. The data were gathered through a questionnaire survey and analyzed using structural equation modeling (SEM) to test the following hypotheses: a positive LA and LB are positively associated with S; effective TM can strengthen this positive relationship. Additionally, well-DP can further enhance students' learning experiences and overall S. This study aims to elucidate the relationships among various factors while also seeking to enhance the development of educational technology and improve teaching quality. By proposing optimization recommendations, this research intends to provide valuable insights for the implementation of blended learning models in financial big data courses within Chinese vocational colleges.

2 Methodology

The present study employed a quantitative approach utilizing PLS-SEM to investigate the factors influencing the S of Chinese vocational college students with the blended teaching for financial big data courses. PLS-SEM was selected due to its strong suitability for exploratory research, as it effectively analyzes the relationships between predictor variables and outcomes while accommodating complex models.

Specifically, the independent variables encompass the following dimensions:

L encompasses two key sub-dimensions: LA and LB. LA pertains to students' interest and confidence in blended learning, whereas LB emphasizes students' engagement and reflective practices throughout the learning process.

T: This encompasses three key components: Teaching Attitude (TAT), TM, and Teaching Ability (TAB). TAT assesses the extent of teachers' engagement in pre-class preparation and their responsiveness to questions after class. TM involves the application of diverse instructional strategies, including lectures, case studies, discussions, and practical exercises. TAB evaluates teachers' proficiency in information technology as well as the depth of their subject matter expertise.

C: This encompasses Course Design (CD) and PD. The evaluation focuses on the quality of both online and offline learning resources, as well as their alignment with established learning objectives. PD specifically assesses the user-friendliness and functional completeness of the learning platform.

The dependent variable in this study is students' overall S with the blended learning mode, which reflects their comprehensive assessment of the learning experience provided by this instructional approach.

2.1 Sample

The samples were collected from Jinan Preschool Education College, Shandong Institute of Commerce and Technology, and Dong ying Vocational College of Shandong Science & Technology. The participants comprised students majoring in big data and accounting at these three higher vocational institutions. A total of 350 questionnaires were distributed, with 291 deemed valid, resulting in an effective response rate of 83.14%.

2.2 Data Analysis

The data processing was conducted using Smart PLS 4.0 software. PLSSEM was selected due to its appropriateness for exploratory research and its capability to analyze complex models.

Table 1. Reliability and Validity Analysis.

Dimension	Cronbach's alpha(α)	CR	AVE
CD	0.947	0.948	0.863
LA	0.892	0.895	0.822
LB	0.886	0.894	0.898
PD	0.923	0.923	0.928
S	0.957	0.958	0.854
TAB	0.932	0.932	0.937
TAT	0.903	0.903	0.911
TM	0.931	0.931	0.936

The Cronbach's Alpha values for all dimensions exceeded 0.8, and the Composite Reliability (CR) values also surpassed 0.8, demonstrating a high level of internal consistency within the scale. Furthermore, the Average Variance Extracted (AVE) values for each dimension significantly exceeded 0.5, indicating robust convergent validity of the scale. (See Table 1). Additionally, all Variance Inflation Factor (VIF) values were below 5, suggesting that multicollinearity issues among these items are not present.

Table 2. Fornell-Larcker.

	CD	LA	LB	PD	S	TAB	TAT	TM
CD	0.929							
LA	0.718	0.907						
LB	0.653	0.733	0.947					
PD	0.846	0.704	0.679	0.963				
S	0.849	0.800	0.718	0.867	0.924			
TAB	0.890	0.642	0.631	0.756	0.752	0.968		
TAT	0.822	0.705	0.676	0.778	0.775	0.869	0.955	
TM	0.843	0.671	0.637	0.737	0.746	0.909	0.878	0.967

The square root of the AVE for all constructs exceeds the correlation coefficients with other constructs, demonstrating robust discriminant validity. This finding indicates that the intermediate energy dimensions examined in this study are distinctly identifiable, thereby reinforcing both the validity and stability of the model. (See Table 2)

The R² value for variable S is 0.845, demonstrating the model's strong explanatory power. This indicates that the independent variables—namely LA, LB, TM, CD, and PD—significantly contribute to explaining the dependent variable S and can effectively predict students' satisfaction to a considerable degree. Furthermore, this finding not only confirms the substantial impact of various factors on student satisfaction but also offers empirical evidence for enhancing the blended learning approach in financial big data courses at higher vocational institutions.

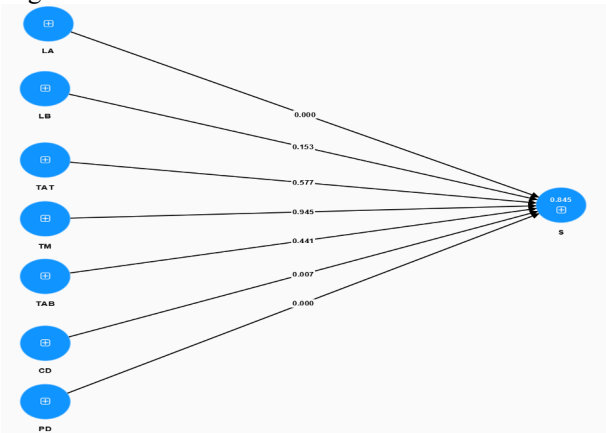


Fig. 1. Key Factors Influencing Student Satisfaction in Blended Financial Big Data Courses.

The analysis employed PLS-SEM and bootstrapping with 5000 resamples to conduct repeated sampling assessments, determining the significance level of the path coefficients. The results indicated a P-value of less than 0.05 and a T-value exceeding 1.96, signifying that the path coefficients were statistically significant. This outcome reinforces the robustness and reliability of the research findings, providing a solid statistical foundation for hypothesis testing. (See Fig 1)

Table 3 illustrates the interrelationships among the variables and highlights the statistical significance associated with each pathway.

Table 3. The results of the Path Analysis.

Path Coefficients	Path coefficients	T values	P values
CD -> S	0.312	2.689	0.007
LA -> S	0.268	4.497	0.000
LB -> S	0.072	1.428	0.153
PD -> S	0.388	4.300	0.000
TAB -> S	-0.076	0.771	0.441
TAT -> S	0.040	0.558	0.577
TM -> S	0.006	0.069	0.945

Although the impact of TAB on student S appears to be negative, both the t-value and p-value do not reach statistical significance (See Table 3). This lack of significance may be attributable to random variation or could be influenced by other confounding variables. Additionally, factors such as students' personal preferences, course design, and platform quality might obscure any potential positive effects of teaching ability. Therefore, further analysis and validation are warranted in future research endeavors.

3 Discussion

Through path coefficient analysis, this study revealed that CD ($p=0.007$), LA ($p<0.000$), and PD ($p<0.000$) significantly positively influenced the S levels associated with the blended teaching mode of financial big data courses. In contrast, LB ($p=0.153$), TAB ($p=0.441$), TAT ($p=0.577$), and TM ($p=0.945$) did not demonstrate any significant effects. The findings indicate that optimizing course design, enhancing students' learning attitudes, and improving the quality of professional development are essential for elevating student success. A positive learning attitude ($p<0.000$) has a significant impact on student outcomes, while a positive trend was observed in learning behaviors, although it did not achieve statistical significance. This underscores the importance of fostering students' positive learning attitudes. Although TM did not demonstrate significant effects in this study, the implementation of appropriate interaction and feedback mechanisms contributed to enhancing students' engagement and satisfaction [3]. Future research should further investigate the impact of various teaching methods across specific subjects.

This study demonstrates that CD, LA, and PD significantly enhance the blended teaching mode of financial big data courses. These findings align with those reported

by Cheng et al. (2023) in the context of higher education in China, thereby reinforcing the significance of these factors across various educational settings [5].

There are several potential explanations for the lack of significant effects observed in LB, TAB, TAT, and TM. Firstly, although LB positively influences S, its inherent complexity and variability may hinder its ability to achieve a statistically significant impact. Furthermore, the impact of TAB, TAT, and TM may not be discernible due to limitations in sample size or the complexity of measurement instruments. For instance, the effectiveness of TM may hinge on specific implementation nuances and the quality of interactions between teachers and students. These critical factors might not be sufficiently addressed in existing research. To enhance the impact of these non-significant factors, educational practitioners may consider implementing the following strategies:

First, it is essential to strengthen teacher training programs aimed at enhancing educators' instructional abilities and interactive skills. Second, employing a variety of teaching methods—such as case-based instruction, project-driven learning, and role-playing—can effectively stimulate students' interest in learning.

Third, establishing a regular feedback and evaluation mechanism allows for dynamic adjustments to both teaching content and methodologies, ensuring that the instructional process remains flexible and responsive to student needs.

These initiatives not only contribute to improving teaching quality but also align more closely with students' expectations and requirements, thereby indirectly boosting overall satisfaction levels. Research on PD indicates that effective PD plays a crucial role in enhancing student S ($p < 0.000$) and fosters a more favorable learning experience. Students expressed a positive response to features such as user-friendly online modules, flexible study schedules, and minimized commuting times. These findings reinforce the notion presented in prior research that optimizing the design of technology platforms not only enhances learning efficiency but also contributes to greater overall student satisfaction. [1][3]. This study highlights the significance of incorporating LA, TM, and PD in the development of blended learning to enhance students' overall learning experiences and satisfaction. Future research should aim to validate these findings on a broader scale and investigate how these factors can be more effectively integrated to foster ongoing improvements in educational quality.

4 Conclusions

The findings of this study indicate that CD, LA, and PD significantly enhance the improvement of student S. In contrast, LB, TAB, TAT, and TM do not demonstrate any significant effects. These results underscore the importance of optimizing course content, fostering a positive LA among students, and enhancing the design quality of technological platforms as critical factors for improving student S in blended learning model development. The CD must prioritize the practicality and relevance of its content to effectively address the actual needs of students. Concurrently, it is essential to employ diverse strategies that stimulate students' motivation and interest in learning, thereby fostering a positive attitude toward their educational journey.

The study further confirmed a positive correlation between positive LA and student S. It is noteworthy that while TM did not demonstrate a significant impact in this research, effective interaction and feedback mechanisms can substantially enhance students' sense of engagement and satisfaction. When implementing a blended learning approach, it is crucial to focus on strategies that stimulate students' enthusiasm for learning through interactive elements and constructive feedback. For instance, the engagement between educators and learners can be enhanced through online discussion forums, real-time Q&A sessions, and various other methods that facilitate prompt and effective feedback. This approach not only fosters a greater sense of participation among students but also enriches their overall learning experience.

For factors that do not demonstrate a significant impact, such as LB, TAB, TAT, and TM, potential explanations may include inadequate sample sizes, the use of insufficiently advanced measurement tools, or the inherent complexities present in specific educational contexts. To achieve this objective, the following strategies are recommended: First, enhance teacher training programs to elevate educators' instructional capabilities and interactive competencies. Second, implement a variety of teaching methodologies, such as case-based instruction and project-driven learning, to engage students' interest in their studies. Finally, establish regular feedback and evaluation mechanisms for students to facilitate dynamic adjustments in teaching content and methods, ensuring the flexibility and adaptability of the educational process. These initiatives not only contribute to improving teaching quality but also align more closely with students' needs and expectations, thereby indirectly enhancing overall satisfaction.

This study primarily targets Chinese vocational college students, particularly those enrolled in financial big data courses, with the aim of investigating specific phenomena and patterns within this educational context. However, it is important to note that this research does not examine whether these findings are applicable to students from other disciplines or in different countries. Consequently, there may be limitations regarding the generalizability of its conclusions, necessitating further investigation to assess their relevance in broader contexts.

References

1. Rajeshwari Panigrahi, Khaliq Lubza Nihar, and Neha Singh. 2024. Quality measurement of the blended learning model in higher education: Scale development and validation. *Higher Learn. Res. Commun.* 14, 1 (2024), 86–102.
2. Dongmei Zhou. 2024. An investigation on college student satisfaction in blended learning. In *Proceedings of the 10th International Conference on Arts, Design and Contemporary Education (ICADCE 2024)*, 04–22.
3. Rosemary Fisher, Aron Perényi, and Naomi Birdthistle. 2021. The positive relationship between flipped and blended learning and student engagement, performance and satisfaction. *Active Learn. High. Educ.* 22, 2 (Oct. 2021), 97–113.
4. Shopyan Jepri Kurniawan, Muhammad Nur Wangid, and Agus Supriyanto. 2022. Students' satisfaction in college: Implementation of the blended learning method. *Eur. J. Educ. Stud.* 9, 5 (2022), 274–284.

5. Xiaoliang Cheng, Weilan Mo, and Yujing Duan. 2023. Factors contributing to learning satisfaction with blended learning teaching mode among higher education students in China. *Front. Psychol.* 14 (June 2023), 1193675, 1–12.
6. Xingyang Wang, Xiaohui Chen, Xinyi Wu, Jia Lu, Bin Xu, and Hanxi Wang. 2023. Research on the influencing factors of university students' learning ability satisfaction under the blended learning model. *Sustainability* 15, 16 (Aug. 2023), 12454.
7. Andrea J. Doyle, Conor C. Murphy, Fiona Boland, Teresa Pawlikowska, and Joan Ní Gabhann-Dromgoole. 2024. Education in focus: Significant improvements in student learning and satisfaction with ophthalmology teaching delivered using a blended learning approach. *PLOS One* 19, 7 (July 2024), e0305755.
8. Ghada ElSayad. 2024. Drivers of undergraduate students' learning perceptions in the blended learning environment: The mediation role of metacognitive self-regulation. *Educ. Inf. Technol.* 29, 12 (Feb. 2024), 15737–15760.
9. Meng Hua, Lin Wang, and Jun Li. 2024. The impact of self-directed learning experience and course experience on learning satisfaction of university students in blended learning environments: The mediating role of deep and surface learning approach. *Front. Psychol.* 14 (Jan. 2024), 1278827.
10. Suchismita Sarkar, Saroj Sharma, and Shashi Raheja. 2021. Implementation of blended learning approach for improving anatomy lectures of Phase I MBBS students–Learner satisfaction survey. *Adv. Med. Educ. Pract.* (Apr. 2021), 413–420.

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