International Education Forum, 2024, Volume 2, Issue 6
http://ojs.bbwpublisher.com/index.php/IEF
Online ISSN: 2981-8605

Practice Report on the "Internet+" Blended Teaching Model in the Digital Context—A Case Study of "Economic Mathematics" on the Cloud Classroom Platform

Yuan Wei*, Feng Xu

Guangxi Financial Vocational and Technical College, Nanning 530007, China

Corresponding author: Yuan Wei, weiyuan412@163.com

Abstract: Promoting education modernization through educational informatization is a strategic choice for the development of China's education sector. This paper aims to explore how to use the "Internet+" blended teaching model to improve the teaching effectiveness of vocational college mathematics in the digital context. It first analyzes the limitations of traditional "Economic Mathematics" teaching and compares the advantages of teaching reform in the digital context. It then analyzes the current state of "Economic Mathematics" teaching and demonstrates, through a dual-group experiment, that the "Internet+" blended teaching model on the Cloud Classroom platform significantly improves teaching quality.

Keywords: Digitalization; Internet+; Blended teaching; Practice report

Online publication: August 13, 2024

1. Introduction

With the rapid development of information technology, the wave of digitalization has swept across the globe, bringing unprecedented changes to the field of education. The 2022 National Education Work Conference explicitly proposed the implementation of the educational digitalization strategy action plan [1]. In this context, the field of education is facing unprecedented development opportunities as well as numerous challenges. The rise of the "Internet+" blended teaching model is a positive response to the digital education background. "Economic Mathematics," as an essential foundational course, holds a crucial position in multiple disciplines such as economics, finance, and accounting. However, the traditional teaching model of "Economic Mathematics" often has several drawbacks, such as monotonous content, outdated teaching methods, and insufficient teacher-student interaction. These issues have, to some extent, hindered students' in-depth learning and understanding of the course. Therefore, leveraging modern information technology to build a learner-centered educational ecosystem and enhance the teaching effectiveness of the "Economic Mathematics" course has become an urgent problem to be solved in the current educational field.

2. Current research status

Blended teaching has been developing for nearly thirty years globally. In 2003, Professor He Kekang formally introduced the concept of blended learning in China [2]. He defined blended learning as the organic integration of face-to-face classroom learning and digital learning (Online-Learning or E-Learning). With the advent of the "Internet+" era, the blended teaching model has gained broader attention and application [3]. Against the backdrop of deepened educational informatization, blended teaching models are increasingly appearing in university classrooms, especially in theoretically intensive courses like "Economic Mathematics."

Xing believes that the blended teaching model has two important components: online learning and classroom learning. Guo suggests that blended teaching integrates information technology with educational instruction, combining online teaching with traditional teaching into an "online + offline" teaching model. Early blended teaching emphasized these two essential components, face-to-face and online teaching. After various stages of development and evolution, blended teaching has entered the "Internet+" phase. Feng and others argue that blended learning in the "Internet+" era is a disruptive innovation, fundamentally shifting the role of teachers from subject experts and knowledge transmitters to learning designers and facilitators. Currently, blended learning is experiencing explosive growth [4].

Cloud Classroom, an interactive teaching app integrated with artificial intelligence technology, continues to demonstrate its strong application potential in higher education. Many universities have introduced Cloud Classroom as an educational informatization tool in classrooms, achieving innovations in the mobile internet + blended teaching model. For instance, Xie Na and others designed an online-offline blended teaching model on the Cloud Classroom platform for experimental teaching in oral histopathology, achieving better teaching outcomes than traditional lecture-based methods, which is worth further exploration [5]. Li Ming, in his research, constructed a teaching evaluation system based on the Cloud Classroom platform, comprehensively evaluating students' learning through multidimensional data analysis of online learning behavior, homework completion, and test scores [6].

In recent years, research on the application of the Cloud Classroom platform in the "Internet+" blended teaching model has been abundant. However, most literature focuses on system introduction, operational details, advantages, and teaching design theories. There is a lack of studies evaluating the application effects of the Cloud Classroom platform in specific teaching practices, especially those that use dual-group experimental comparisons and data-based evidence to verify teaching effectiveness. This paper selects two classes taught by the author as experimental subjects, using the "Economic Mathematics" course as the experimental carrier. A dual-group experimental design is adopted to explore the practical application effects of the "Internet+" blended teaching model based on the Cloud Classroom platform. The project presents the experimental process, results, and conclusions in detail through experimental design, data collection, and statistical analysis. This provides empirical support for the effective application of the Cloud Classroom platform in the "Internet+" blended teaching model and offers valuable references and insights for other researchers and educators.

3. Comparison of traditional teaching model and "Internet+" blended teaching model in "Economic Mathematics"

3.1. Limitations of the traditional teaching process

In the traditional teaching process of "Economic Mathematics," there are frequent demonstrations and explanations of key steps in problem-solving, which students find difficult to remember. There are two main reasons for this: First, it is challenging for students to maintain a high level of attention for an extended period during lectures. Second, students have limited memory capacity, making it hard to remember new content after

a single explanation from the teacher. The "Internet+" blended teaching model can effectively address these issues. For instance, when students encounter problems, they can repeatedly view learning resources such as cloud textbooks, teaching micro-lectures, courseware, and instructional videos in the Cloud Classroom library to review knowledge, achieving the effect of learning anytime and anywhere.

3.2. Monotony of traditional teaching content

Traditional teaching content is based on stability and uniformity, where students receive standardized knowledge without constructing personalized knowledge. The "Internet+" technology changes the traditional single learning mode, expanding knowledge sources and information exchange methods, and providing a foundation for students' self-directed learning. For example, using the Cloud Classroom platform, teachers can push excellent teaching cases, courseware, videos, and micro-lectures to students, achieving a rich learning experience with text and images. By analyzing students' learning situations, tailored digital course resources can be provided, facilitating individualized teaching and better integration of mathematics with various majors. The Cloud Classroom's online classroom, group tasks, polls, brainstorming sessions, light live discussions, classroom questions, exercises, and homework can enrich classroom teaching. The "Internet+" blended teaching model offers relatively personalized learning resources and auxiliary tools, providing students with more opportunities for self-directed learning [4].

3.3. Limitations of traditional teaching evaluation

Traditional teaching assessments for "Economic Mathematics" focus on outcome-based evaluation, which cannot fully and accurately reflect students' overall performance. The "Internet+" blended teaching model employs flexible and diverse evaluation methods, enabling comprehensive evaluation of students. Teachers can track students' learning through their learning trajectories and assess their overall learning level based on their "experience points." Furthermore, traditional teaching models often neglect students' active participation. Addressing these issues is crucial for promoting high-quality development of vocational mathematics in the digital context. For instance, using the Cloud Classroom platform, teachers can push excellent teaching cases, courseware, videos, and micro-lectures to students, achieving a rich learning experience with text and images. By analyzing students' learning situations, tailored digital course resources can be provided, facilitating individualized teaching and better integration of mathematics with various majors. Additionally, the Cloud Classroom's online classroom, group tasks, polls, brainstorming sessions, light live discussions, classroom questions, exercises, and homework can enrich classroom teaching. The "Internet+" blended teaching model offers relatively personalized learning resources and auxiliary tools, providing students with more opportunities for self-directed learning.

With the advent of the digital era, teaching in university mathematics courses faces new opportunities and challenges. "Economic Mathematics," a theoretically intensive public foundational course offered by the School of Finance and Economics, is abstract in concept, highly logical, and involves complex problem-solving. The traditional mathematics teaching model, relying solely on lectures, cannot meet students' diverse learning needs. Implementing a digital blended teaching model can improve teaching effectiveness and learning efficiency, enabling teaching and learning to transcend limitations of time, place, and learning methods, and supporting anytime, anywhere learning and multi-terminal access. The blended teaching model for "Economic Mathematics" on the Cloud Classroom platform integrates online and offline teaching, providing a flexible and personalized learning experience, enhancing teacher-student interaction and student collaboration. Throughout the teaching process, emphasis is placed on cultivating students' self-directed learning abilities, teamwork, and

problem-solving skills. By blending online and offline teaching, diverse learning resources and experiences are provided to students, stimulating their enthusiasm and creativity in learning [5].

4. "Internet+" blended teaching model

With the advent of the digital era, teaching university mathematics courses faces new opportunities and challenges. "Economic Mathematics," a theoretically intensive public foundational course offered to students majoring in finance and trade, has abstract concepts, strong logic, and complex problem-solving. The traditional mathematics teaching model, which relies solely on lectures, cannot meet students' diverse learning needs. The application of digital technology can improve teaching effectiveness and learning efficiency, allowing teaching and learning to transcend the limitations of time, place, and learning methods, supporting the need for anytime, anywhere learning and multi-terminal access. Meanwhile, course content as the carrier of teaching activities will transition from fixed, structured knowledge to dynamic, open, and unstructured formats.

The blended teaching model for "Economic Mathematics" on the Cloud Classroom platform integrates online and offline teaching, providing a flexible and personalized learning experience, enhancing teacher-student interaction and student collaboration. The design approach is as follows.

Firstly, clarify the teaching objectives and content to ensure that online and offline teaching content complement and promote each other. Secondly, establish effective preview and review mechanisms. Teachers use the Cloud Classroom platform to assign preview tasks and provide review materials, guiding students to familiarize themselves with the course content in advance. In classroom teaching, teachers should make full use of the interactive functions of the Cloud Classroom platform, such as online polls, real-time Questions and Answers (Q&A), and brainstorming, to stimulate students' interest and participation. After class, teachers should promptly grade assignments and provide online Q&A services to ensure students' learning issues are addressed promptly. Additionally, teachers can utilize the data analysis functions of the Cloud Classroom platform to monitor and assess students' learning in real-time, providing data support for teaching improvement [6].

5. Practical verification of the "Internet+" blended teaching model

This study uses two classes from the 2023 cohort of the Insurance and Accounting majors at Guangxi Financial Vocational and Technical College as experimental subjects. The experiment spans one semester (March 2024 to June 2024) and involves conducting an "online + offline" blended teaching experiment based on the Cloud Classroom platform.

5.1. Preliminary preparation

As a modern and progressive teaching method, blended teaching based on the Cloud Classroom requires teachers to first understand and learn how to use the platform. For example, they need to know how to set up cloud textbooks, use the cloud textbook editor, push learning resources, operate interactive classrooms, assign homework, set experience points, and export teaching analysis reports. Teachers must familiarize themselves with the software and these operations to effectively facilitate student learning through the Cloud Classroom platform [7].

5.2. Main experimental steps for the experimental class

The following outlines the main experimental steps for implementing this innovative teaching model in an experimental class setting, ensuring a comprehensive and effective learning experience for students:

(1) Creating the class function: List the student classes and course names, import the course learning

requirements, teaching plans, and assessment arrangements, and generate an invitation code for students to join the class.

(2) Publishing learning materials: Teachers upload learning materials using local files, web links, cloud textbooks, or resources from the resource library. These materials include recorded micro-lessons, PowerPoint presentations (PPTs), Portable Document Format (PDF) files, teaching plans, lesson plans, web pages, cloud textbooks, and previously shared resources, with specific learning requirements and experience points set.

(3) Pre-class preparation: Teachers push "Economic Mathematics" course resources to students via the Cloud Classroom platform and remind them through the "Notification" function to review pre-class materials, including new course learning objectives and key points. Students preview these materials independently and earn corresponding experience points. This online preview gives students a general understanding of the content before the actual class.

(4) In-class activities: Teachers use the check-in function, employing "one-click check-in" or "gesture check-in" to monitor attendance. They randomly or manually select students for interactions using the "random selection" or "hand-raising" features and use the "quick response" function to enhance classroom engagement and interaction. Various online activities such as Q&A, brainstorming, and polls are also used.

(5) Post-class activities: Students can access learning resources anytime to solve problems or communicate with teachers and classmates. Teachers assign homework and post-class tests via the Cloud Classroom platform.

(6) Control class: The control class maintains the original traditional teaching model and assessment methods.

5.3. Experimental model

This study adopts a dual-group experimental model, establishing an experimental class and a control class. The "Insurance 2301" class from the 2023 Insurance Department is selected as the experimental class, where the Cloud Classroom platform's online + offline blended teaching model is implemented. The "Accounting 2302" class from the 2023 Accounting Department is selected as the control class, where the traditional teaching methods remain unchanged [8].

5.4. Implementation and effects of the experiment

5.4.1. Attendance

On the Cloud Classroom platform, teachers can initiate check-in before class, using one-click or gesture check-in for immediate attendance tracking. Compared to traditional attendance using student rosters, Cloud Classroom check-ins save time and effort. In this experiment, the control class had 46 students with an average attendance of 43 students per class, resulting in a 93% attendance rate. The experimental class had 48 students with an average attendance of 48 students per class, achieving a 100% attendance rate.

5.4.2. Preview situation

Students preview materials released by teachers on the online teaching platform. In the control class of 46 students, an average of only 4 students per class completed pre-class previews throughout the semester. In contrast, in the experimental class, an average of 21 students per class completed pre-class previews using the learning materials provided on the Cloud Classroom platform. Mobile phones and the internet are essential tools used frequently by students, who can conveniently access teaching resources on their phones, iPads, or other devices during their commute or before bed.

Table 1. Preview results of the experimental class and control class

	Control Class	Experimental Class
Number of Students	46	48
Average Number of Students Who Completed Pre-Class Previews per Session	4	21
Preview Percentage	8%	43%

5.4.3. Classroom Interaction

For classroom questions, the control class used the traditional hand-raising method, while the experimental class used various features of the Cloud Classroom such as "hand raising, quick response, random selection, and manual selection." The percentage of students participating in quick responses in the control class was 28%, while in the experimental class was 72% [9].

5.4.4. Practice participation

In the control class of 46 students, the practice participation rate was 59%. In the experimental class of 48 students, the practice participation rate was 94%.

5.4.5. Homework

Both classes were assigned the same homework. The control class submitted handwritten assignments, whereas the experimental class used the "homework" feature on the Cloud Classroom platform. The submission rate for the control class was 96%, while the submission rate for the experimental class was 100%.

5.5. Exam results

5.5.1. Comparison of pre-test and post-test results in the experimental class

The post-test math exam scores in the experimental class showed a significant increase from an average of 81 to 90.5. This indicates that the experimental learning through the Cloud Classroom significantly improved students' math learning.

5.5.2. Comparison of pre-test and post-test results in the control class

The post-test math exam scores in the control class showed little change, increasing slightly from an average of 83 to 84.5, and remained at a "good" level without reaching the "excellent" level. This suggests that not using the Cloud Classroom had little impact on students' math scores, which remained relatively weak.

5.5.3. Comparison of pre-test and post-test results between the two classes

Before the experiment, the experimental class had lower scores than the control class. After the experiment, the experimental class had higher scores than the control class. This demonstrates that using the Cloud Classroom blended teaching model can significantly improve students' math scores.

Table 2. Comparison of students' math scores before and after the experiment

Control Class		Experimental Class	
Pre-Test Average Score	**Post-Test Average Score**	**Pre-Test Average Score**	**Post-Test Average Score**
83	84.5	81	90.5

This experiment applied the blended teaching model based on the digital intelligent platform Cloud Classroom to the "Economic Mathematics" course. After a semester of practice, the "Internet+" blended teaching model has achieved significant results. This model has improved student attendance rates, increased self-motivation, enhanced classroom interaction, boosted student participation, and increased homework submission rates, significantly improving students' performance in "Economic Mathematics."

6. Conclusion

Through exploration and practice, the "Internet+" blended teaching model based on the Cloud Classroom platform has promoted the management of learning resources, class management, classroom performance management, and teaching activities management, effectively improving teaching outcomes and fostering students' self-learning abilities. After a period of practical application, the following conclusions have been drawn: The "Internet+" blended teaching model has improved students' math learning outcomes, including significant improvements in attendance rates, self-motivation, classroom interaction, participation rates, homework submission rates, and academic performance. The "Internet+" blended teaching model for "Economic Mathematics" on the Cloud Classroom platform has achieved remarkable success, making this model worthy of promotion and application in vocational education.

Funding

Basic Capability Enhancement Project for Young and Middle-aged Teachers (Scientific Research) in Guangxi Universities, "Mechanisms and Pathways of the Impact of Teacher Charisma on Student Mental Health" (Project No. 2024KY1578)

Disclosure statement

The authors declare no conflict of interest.

References

[1] Li M, Zhang H, Ge N, 2023, Essentials and Approaches to the Digital Transformation of Education. China Educational Technology, 2023(08): 1–6.

[2] Jiang H, 2023, Research on the Application of 'Internet+' Online and Offline Blended Teaching in Vocational Colleges. Liaoning Higher Vocational Journal, 25(07): 28–32.

[3] He K, 2004, New Developments in Educational Technology Theory from the Perspective of Blended Learning (Part 1). China Educational Technology, 2004(03): 5–10.

[4] Xing X, 2016, Problems and Countermeasures of Blended Teaching Mode in Higher Education in the "Internet+" Era. China Market, 2016(50): 195–196.

[5] Guo Y, 2018, Design Research on Blended Teaching Mode Based on Cloud Classroom. Information and Computer (Theoretical Edition), 2018(14): 236–238.

[6] Feng X, Sun Y, Cao J, 2019, Blended Learning in the 'Internet+' Era: Learning Theory and Pedagogy Foundation. China Distance Education, 2019(02): 7–16 + 92.

[7] Wang H, Zhou Q, Li M, et al., 2023, Research and Practice of Blended Teaching Mode in Graduate Clinical Teaching. Journal of Traditional Chinese Medicine Management, 31(23): 15–17.

[8] Cheng J, Cui Y, Li M, et al., 2022, Analysis of Core Elements in the Digital Transformation of Higher Education Teaching—From the Perspective of Schools, Majors, and Courses. China Educational Technology, 2022(07): 31–36.

[9] Yu X, 2018, Application Comparison of Online Teaching Platforms in "Accounting" Teaching Reform—A Case Study of UMOOCs and Blue Ink Cloud Classroom. Education Modernization, 5(51): 73–74.