

# *Research and Practice of Blended Teaching Model for the Course 'Introduction to Big Data' in Business Administration under the New Business Education Context*

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**Abstract:** This paper proposes a teaching model framework for the course "Introduction to Big Data" under the new business education context. The model integrates the Project-Based Learning (PBL) teaching model with a blended online and offline teaching approach and has been successfully applied in undergraduate and postgraduate curriculum teaching reform. The paper begins by outlining the background and urgency of offering the "Introduction to Big Data" course, followed by an introduction to the blended teaching model framework that combines project-based learning and online-offline teaching methods. It then details the teaching objectives, content, process, and assessment steps of the blended teaching model. Subsequently, the paper discusses the application of this model in the teaching practice of the "Introduction to Big Data" course and analyzes its teaching effectiveness through survey questionnaires. The assessment results indicate that both learning outcomes and teaching methods have achieved satisfactory results. The conclusions of this study provide practical references for the teaching reform of "Introduction to Big Data" courses in the era of new liberal arts and business education.

## 1. Introduction

The world has entered a new era of technology and economy, the Age of Artificial Intelligence (AI Era). The uncertainty in the business environment is increasing, competition among enterprises is intensifying, and the pace of new technology iteration, especially the continuous expansion of applications based on Artificial intelligence large models, is accelerating. How companies survive and develop in this intense competition poses greater demands on the education of business administration professionals, particularly for future business managers. Therefore, in the AI era, the role of business administration education is becoming increasingly significant for economic

development.

The most significant characteristic of the business environment in the AI era is that data has become the primary driving factor for business decisions. The degree of automation in business operations and work efficiency has greatly improved. The pace of product innovation and renewal has accelerated, and business models and the speed of business innovation are continuously evolving. Therefore, the AI era poses new requirements for traditional business administration education, demanding that students in this field must possess the following capabilities: (1) Data utilization ability. The foundation of AI application is big data, which comes from various aspects of society and work. The ability to use vast amounts of data has become a crucial skill in the AI era. (2) AI application ability. In the AI era, big data is like modern oil, and business processes and decision-making in this era will rely on AI, enabling scientific and efficient decision-making. (3) Interdisciplinary ability. In the AI era, the boundaries between disciplines are becoming increasingly blurred, and there is more interpenetration between them, requiring business administration students to possess interdisciplinary thinking and develop a habit of lifelong learning.

To meet the new demands for business management talent in the AI era, integrating AI-related courses into business administration curricula has become an urgent issue to address. To enable students to master AI technologies and applications, learning must begin with the fundamentals of AI. As the source of AI applications, big data has become an essential course in business administration. The course "Introduction to Big Data", serving as an entry-level course for big data-related majors, plays a vital role in sustaining the study of relevant professional knowledge and fostering interest. Considering the characteristics of the "Introduction to Big Data" course and societal needs, it is necessary to implement new teaching models tailored to the features of big data. This paper proposes a blended teaching reform model, combining project-based learning with online and offline teaching modes, to implement a new teaching approach for the "Introduction to Big Data" course. The specific steps for educational reform research and practice begin with theoretical integration research, followed by defining the teaching objectives, content, process, practices, and assessment methods for the "Introduction to Big Data" course, and concluding with suggestions for educational reform.

## 2. Theoretical Basis

### 2.1 PBL Theory

The PBL (Project-Based Learning) educational theory originated from the Faculty of Medicine at McMaster University in Canada. Its main characteristic is the shift from traditional teaching theories, advocating a student-centered approach to learning<sup>[1]</sup>. The implementation steps of the PBL teaching model include: (1) project design, (2) planning, (3) activity implementation, (4) results communication, and (5) activity evaluation<sup>[2]</sup>. Specifically, the content of each step can be described as follows: (1) Project design, or problem definition, is the first step in implementing PBL teaching. (2) Planning, or problem decomposition, encourages collective discussion among students, idea sharing, and fosters a spirit of unity and cooperation. (3) Implementation, or the application of knowledge stage, involves students applying newly acquired knowledge to problem-solving, including the analysis, synthesis, and evaluation of information. (4) Results communication involves the presentation and discussion of findings and solutions, which can be done through oral reports, written reports, or other methods. (5) Activity evaluation is a critical component of the PBL teaching method, aimed at providing a comprehensive evaluation of the entire research process. This evaluation is essential for testing the effectiveness of the teaching and the achievement of learning objectives.

The PBL (Project-Based Learning) educational concept emphasizes a student-centered approach

to learning. By stimulating students' initiative and collaborative spirit, it aims to cultivate their innovative abilities. In this process, teachers play a key role in organization and guidance, which also indicates that this teaching model places higher demands on the comprehensive qualities of teachers. At the same time, the PBL educational model also promotes the enhancement of teachers' comprehensive abilities.

## 2.2 Online and Offline Teaching Model

The online and offline teaching model (also known as the OMO model) combines internet-based and physical classroom teaching. The framework of the online and offline teaching model<sup>[3]</sup> includes: (1) An educational theory framework that integrates online and offline learning. (2) The OMO teaching method that enables bidirectional empowerment. (3) Learning evaluation driven by digital intelligence. The OMO model takes full advantage of both online and offline teaching, representing a new teaching method that highlights the characteristics of the internet era, with the following advantages: (1) Flexibility. This model can adjust the learning pace according to different students' backgrounds, thereby facilitating autonomous learning. (2) Integration of different resources. The biggest difference between the online and offline teaching model and traditional classroom education lies in the ways educational resources are accessed. Online learning can better integrate resources from the entire network, thereby enriching teaching content and achieving integration of educational resources. (3) Facilitating student interaction and collaboration. Online learning platforms provide opportunities for students' autonomous learning to participate and discuss. Through online interaction, students are encouraged to learn from each other and engage in discussions, thus fostering a spirit of collaboration.

The online and offline teaching model (OMO model) is a new teaching model that has emerged with the development of information technology and the changing demands of education. It has the potential to reduce educational costs and enhance student initiative and has been increasingly applied in the field of higher education.

## 2.3 Blended Teaching Model

The PBL teaching model and the online and offline model each have their advantages. To better leverage the strengths of both models, this study proposes to combine them into a new integrated model. By integrating PBL theory with online and offline methods, it aims to increase the participation and collaboration of teachers and students, thereby enhancing the quality of teaching. Specific strategies include: (1) Online learning. Students learn basic theoretical knowledge through pre-produced classroom videos, laying the foundation for offline practice. (2) Offline practice. Practice projects are arranged according to PBL theory, which students complete through offline activities. This helps students discover, analyze, and solve problems. (3) Assessment and feedback. The assessment and feedback stage is a crucial part of the blended teaching model. Only through evaluation can problems in the implementation process be identified, allowing for the improvement of teaching through feedback, achieving closed-loop management, and enhancing teaching efficiency.

## 3. Instructional Design

Based on the aforementioned theoretical requirements, this study constructs an actual teaching plan and carries out teaching practice. The specific steps include setting teaching objectives, designing teaching content, and the teaching process.

### 3.1 Setting Teaching Objectives

Setting teaching objectives involves clarifying the teaching purpose of the course according to the requirements of the course syllabus. Therefore, the teaching objectives must be clearly aligned with the activities and goals outlined in the syllabus. The teaching objective of the "Introduction to Big Data" course is to equip students with the necessary data literacy in the new business environment, including basic knowledge and usage skills.

### 3.2 Designing Teaching Content

Based on the content of the textbook used, the course first introduces big data and related data processing basics, followed by learning about the specific applications of big data in various industries. For this project, the teaching team, considering the specific circumstances of the students and the existing learning conditions, produced 40 short learning videos, each about 10 minutes long. Each video covers a key knowledge point. The specific content of each chapter corresponding to the videos is shown in Table 1.

Table 1: Content Table for Short Video Learning of "Introduction to Big Data" Course

No.	Chapter Name	Chapter Content <sup>[4]</sup>	Number of Videos
1	Big Data Processing	Data collection, data integration, data reduction, data transformation, data cleaning.	6
2	Data Analysis	Statistical analysis and methods, basic concepts of data mining, classic data mining algorithms.	9
3	Big Data Security	Security and privacy issues, security challenges in the era of big data, how to solve big data security issues.	7
4	Fundamentals of Big Data Applications	The era of big data, definition of big data, Baidu Index, usage of GETDATA software.	6
5	Cloud Computing in the Era of Big Data	Overview of cloud computing, cloud computing technology, cloud computing and big data, smart cities based on cloud computing.	4
6	Applications of Big Data in Finance	Overview of financial big data, financial applications and innovations of big data.	3
7	Application of Big Data in Tourism Forecasting	Research status, theoretical introduction, ARDL model, forecasts and conclusions, empirical research.	5

Note: Zunqi Yang, "Introduction to Big Data (Second Edition)", Machinery Industry Press, 2022<sup>[4]</sup>.

### 3.3 Design of the Teaching Process

In accordance with the practical requirements of PBL theory and the blended online and offline teaching model, the teaching process can be divided into two parts: online and offline, detailed as follows.

### 3.3.1 Online Learning

Students engage in video learning through the Zhihuishu online learning platform. Video learning is carried out in an orderly manner according to the teaching plan. Students gain a preliminary understanding of each chapter's content by watching the videos, preparing themselves for offline learning.

In addition to video learning, online teaching also includes discussions through interactive platforms. One of the advantages of online learning is facilitating interactive discussions, which stimulates divergent thinking and fosters students' innovation awareness. Additionally, online learning is conducive to cultivating students' self-learning abilities, which is especially important in the AI era. As technology and knowledge are rapidly evolving in the AI era, students must possess the ability for lifelong learning.

### 3.3.2 Offline Teaching

Offline teaching, as the main form of traditional teaching, occupies an important position in the entire teaching chain. It compensates for the shortcomings of online teaching, such as the lack of face-to-face guidance and real-time interaction. Offline teaching helps students solve difficult problems, provides face-to-face guidance, and offers real-time feedback.

Besides facilitating immediate face-to-face guidance between teachers and students, offline teaching also promotes mutual assistance and cooperation among students. One of the practical implications of PBL theory is to cultivate a spirit of unity and mutual assistance among students. Through offline learning, student groups can engage in face-to-face collaboration, share knowledge, and collectively solve problems in projects, thereby improving learning efficiency.

## 4. Teaching Practice

### 4.1 Teaching Process

To integrate big data teaching into the practice of business management education, the "Introduction to Big Data" course has been offered in an undergraduate institution since 2021. This course has been introduced in the business administration and human resources undergraduate majors, with a total of 22 classes completing the course. Additionally, the course has been offered to master's students in business administration and finance, with successful completion and assessment of the course.

### 4.2 Teaching Evaluation

To evaluate the effectiveness of the teaching, this study used a survey questionnaire method for teaching feedback analysis. The survey targeted graduate and undergraduate students in business administration who elected the "Introduction to Big Data" course. Drawing on relevant research literature, the survey themes included <sup>[5-9]</sup>: (1) Teacher image evaluation, (2) Student expectations evaluation, (3) Student perceived quality evaluation, (4) Student perceived value evaluation, (5) Overall student satisfaction evaluation.

A total of 400 questionnaires were distributed through the online survey software "Wen Juan Xing," and 335 valid responses were collected <sup>[10]</sup>. After reliability and validity analysis of the questionnaire data, the collected data were verified as effective. Statistical analysis of the collected data yielded the assessment results as shown in Table 2.

Table 2: Overall Evaluation of Teaching Effectiveness

Primary Indicator[5-9]	Secondary Indicator	Very Dissatisfied	Dissatisfied	Satisfied	Quite Satisfied	Very Satisfied
Teacher Image Evaluation	Teaching Skills	6.20%	5.90%	14.80%	36.70%	36.40%
	Teaching Attitude	5.60%	4.50%	14.00%	37.30%	38.70%
	Teaching Responsibility	5.60%	4.50%	14.80%	39.80%	35.30%
Student Expectation Evaluation	Learning Effectiveness	4.20%	7.60%	10.60%	42.30%	35.30%
	Assessment Method	6.70%	4.20%	15.40%	37.80%	35.90%
	Resource Richness	3.60%	6.40%	12.00%	40.30%	37.70%
	Outcome Evaluation	4.50%	5.00%	18.50%	39.50%	32.50%
Student Perceived Quality Evaluation	Teaching Quality	6.20%	5.90%	14.80%	36.70%	36.40%
	Teaching Content	3.60%	4.80%	20.40%	36.40%	34.70%
	Knowledge Content	3.90%	5.60%	16.50%	35.90%	38.10%
Student Perceived Value Evaluation	Content Quality	3.40%	7.30%	16.50%	37.50%	35.30%
	Content Practicality	3.90%	7.80%	18.20%	34.50%	35.60%
	Content Frontier	5.00%	4.80%	18.80%	36.40%	35.00%
	Interest Cultivation	5.00%	6.20%	13.70%	41.50%	33.60%
Student Satisfaction Evaluation	Overall Satisfaction	4.20%	3.90%	15.40%	42.30%	34.20%
	Teaching Effectiveness	4.50%	5.30%	18.50%	36.40%	35.30%
	Career Assistance	5.60%	5.60%	16.20%	33.10%	39.50%

Note: The data in the table represent the percentage of respondents for each option.

Based on the feedback data, the overall effectiveness of the teaching is summarized in three points: (1) The sense of teaching responsibility and attitude are outstanding. Teachers have received high ratings in terms of teaching responsibility and attitude, especially in the proportions of "Quite Satisfied" and "Very Satisfied." This indicates that teachers have excelled in demonstrating diligence and a positive attitude, successfully establishing a good image in the minds of students. (2) The teaching methods and skills are well-perceived. In terms of teaching skills, the combined ratings of "Quite Satisfied" and "Very Satisfied" exceed 70%, showing that teachers are effective in imparting knowledge and skills. However, a small portion of students expressed dissatisfaction, suggesting a need to further explore improvements in teaching methods. (3) The learning outcomes and teaching resources are well-received. In the student expectation evaluation section, the learning outcomes and richness of resources received relatively high ratings, especially in the "Satisfied" and above categories. This implies that teachers effectively meet students' learning needs and provide a wealth of teaching resources.

Overall, the teaching process has received positive evaluations from students in several aspects, particularly in terms of teaching attitude and responsibility. However, there are areas that require attention and improvement, as indicated by the presence of a small percentage of "Very Dissatisfied" responses across all evaluation indicators.



## 5. Conclusion

This paper constructs a theoretical framework for a new blended teaching model based on project-based learning combined with online and offline methods. The framework describes the related teaching theories, including the project-based learning model (PBL theory) and the combined online-offline teaching model, proposing a blended teaching approach that incorporates both. The specific teaching process of the blended model is then introduced, encompassing teaching objectives, content, and procedures. To assess the effectiveness of the teaching, a survey questionnaire was designed for anonymous feedback. Analysis of the returned questionnaires showed that teachers' sense of responsibility and teaching attitudes were fully recognized by students, teaching methods and skills performed well, and the overall learning effect was affirmed by students. The post-course feedback indicates that the blended teaching model proposed in this paper is feasible.

Based on the research and practice of this paper, recommendations for the teaching of "Introduction to Big Data" are proposed: (1) Emphasize teacher training. As evident from the teaching evaluation results, the knowledge level of instructors plays a key role in course satisfaction. Therefore, cultivating a team of teachers with comprehensive knowledge is the primary task in achieving teaching objectives. (2) Strengthen the construction of teaching resources. Besides theoretical learning, big data teaching also requires practical application. The sources of big data are different from traditional statistical data, characterized by real-time and large-scale features. Hence, creating feasible practical conditions is necessary for achieving good teaching outcomes. (3) Focus on real-time teaching feedback. The ultimate goal of teaching is to enable students to master big data application methods. Therefore, the role of teaching feedback must be emphasized in teaching practice. Teachers should adjust teaching methods and pace in response to feedback to ensure teaching quality. The conclusions of this paper provide new insights and references for curriculum reform in business administration courses in the new era of business education.

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