

BLENDED LEARNING MODEL FOR UNDERGRADUATE STUDENTS  
MAJORING IN MANAGEMENT LEARNING EFFECTIVENESS IN  
PINGDINGSHAN UNIVERSITY, HENAN PROVINCE

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A thesis submitted in partial fulfillment of the requirements for Doctor  
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Thesis Title Blended Learning Model (BLM) for Undergraduate Students Majoring in  
Mangement Learning Effectiveness in Pingdingshan University, Henan Province

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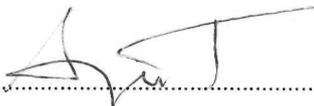
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### **ABSTRACT**

This thesis aims to 1) study the current status of the blended learning model among undergraduate students majoring in Management at Pingdingshan University, 2) develop an OBE (Outcome-Based Education)-WebQuest integrated BLM for these students, and 3) evaluate the effectiveness of the developed model. In Phase 1, the research involved 173 Management undergraduates (55 freshmen, 58 sophomores, 60 juniors) and 10 teachers; Phase 2 develops an OBE-WebQuest integrated BLM for Management undergraduates at Pingdingshan University, revised based on expert IOC scoring. For the third phase, the sample focused on 60 junior Management students (divided into experimental/control groups of 30 each), and the research instrument was pre-test/post-test question banks. and 60 junior Management students (30 in experimental group using BLM, 30 in control group using traditional teaching). Research instruments included questionnaires, interview outlines, Item Objective Congruence (IOC)-validated forms, and pre-test/post-test question banks, with data analyzed via SPSS (t-test, ANCOVA, etc.). The results were found that: Students showed moderate BLM participation but passive resource use and insufficient interaction; teachers noted poor platform personalization. A 6-step blended learning model was developed. After two rounds of expert review, all indicators achieved an IOC score exceeding 0.5 and

passed the validation; Pre-test scores showed no group difference ( $p=0.880$ ); post-intervention, the experimental group's score improvement (12.00 points) was significantly higher than the control group's (8.67 points,  $t=2.476$ ,  $p=0.016$ , Cohen's  $d=0.64$ ), with ANCOVA confirming the BLM's independent effect ( $p=0.013$ ).

**Keywords:** Blended Learning Model, Outcome-Based Education (OBE), WebQuest, Undergraduate Students, Learning Effectiveness

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As I wrap up this dissertation, I'm filled with gratitude for the journey of resilience it has been-late nights refining research frameworks, doubts amid complex data analysis, and the persistence to turn ideas into a cohesive study. First and foremost, I owe my deepest thanks to my major advisor, Assistant Professor Dr. Prapai Sridama. Your rigorous guidance-from walking me through revisions on the model validation protocol to clarifying nuanced data interpretations-ensured this work stayed grounded in academic rigor. Your patience when I revisited WebQuest task designs for the third time, and your encouragement to "lean into the data gaps" during setbacks, were the backbone of this dissertation; you didn't just teach me to complete a study, but to think critically as a researcher. I also thank co-advisors Dr. Sombat Teekasap and Assistant Professor Dr. Kanakorn Sawangcharoen for their expertise in educational technology, which sharpened the study's rigor, and all faculty at Pingdingshan University for laying my academic foundation.

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This dissertation is just a beginning; I will carry these lessons forward, striving to grow stronger, braver, and more purposeful in contributing to undergraduate learning effectiveness.

Zhang Qianhui

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# Chapter 1

## Introduction

### Rationale

Global efforts to advance educational modernization, as reflected in international frameworks like UNESCO's Education 2030 Agenda, emphasize accelerating educational transformation through intelligent higher education platforms to cultivate high-quality, competent talents. The rapid development of information technology and the rise of artificial intelligence are changing the way college students learn. Advanced internet technologies and educational information technology tools are enabling the sharing of learning resources and presenting a trend towards diverse learning platforms.

The rise of mobile learning technologies has enhanced flexibility and personalization in learning (Huang & Zhao, 2021), driving profound changes in educational models. The traditional teacher-centered teaching approach is gradually shifting towards an educational philosophy that emphasizes active learner participation, giving rise to blended learning models. Baker and Jeffries (2019) point out that blended learning provides students with the opportunity to flexibly choose their learning methods, contributing to increased learning satisfaction and effectiveness. Researchers such as Dziuban et al. (2020) and Graham and Vick (2021) emphasize that a successful blended learning model should be student-centered, fully utilizing the advantages of online learning to promote personalized learning and enhance students' autonomous learning abilities. At the same time, Zhao et al. (2021) found that blended learning enhances classroom interaction and student engagement through digital tools, thus improving learning outcomes.

During the college years, students experience a transition from exam-oriented education to a more freedom learning environment, which demands higher self-management skills. Therefore, enhancing the autonomous learning abilities of college students has become a hot topic in scholarly research. The blended learning

model combines the advantages of traditional and online learning, effectively improving students' engagement and self-directed learning capabilities (Tan, 2021). Particularly in Henan Province, college students face challenges such as lack of motivation, difficulty in selecting resources, and learning methods in a blended learning environment. Hence, an in-depth study of the current state of autonomous learning among college students in Henan Province and the development of suitable learning models is of significant importance for enhancing their autonomous learning abilities.

Based on this, this study will systematically analyze the learning status of college students in blended learning environments. Combining OBE and WebQuest, it will develop a blended learning model to enhance undergraduates' autonomous learning effectiveness. An experimental study will evaluate its effectiveness. WebQuest, a structured inquiry method, encourages students to learn through online resources and collaborate with teachers and peers, improving their learning ability and critical thinking.

Integrating OBE and WebQuest into blended learning provides students with clear tasks and resources, aiding effective autonomous learning. This approach meets the demand for active participation and collaborative learning in today's information age, boosting students' enthusiasm and learning outcomes in blended environments.

This study aims to deepen the understanding of how blended learning models improve student learning and inform future course design.

## **Research Questions**

Question 1: What is the current status of the blended learning model for undergraduate students at Pingdingshan University?

Question 2: How to develop a blended learning model tailored for undergraduate students at Pingdingshan University?

Question 3: How to evaluate the effectiveness of the proposed blended learning model?

## Objectives

1. To study the current status of the blended learning model among undergraduate students at Pingdingshan University.
2. To develop a blended learning model for undergraduate student at Pingdingshan University.
3. To evaluate the effectiveness of blended learning model.

## Research Hypothesis

The blended learning model integrates online resources and offline classroom interaction. Students can freely arrange online study time for preview and review, and deepen understanding through face - to - face classroom communication with teachers and classmates. After its implementation, students' learning outcomes are significantly better than those who don't use this model.

## Scope of the Research

### Population and the Sample Group

#### Phase 1:

#### Population

Students: 1,598 undergraduate students at the School of Economics and Management, in Pingdingshan University.

Teachers: 75 teachers at the School of Economics and Management, in Pingdingshan University.

#### The Sample Group

Student Sample: 173 undergraduate students majoring in Management were selected using cluster random sampling. Specifically, there are 55 freshmen in one class, 58 sophomores in another, and 60 juniors in the third class (seniors are not on campus due to internships). Due to differences in the actual enrollment size of each grade, the sample includes all eligible students who could participate in the questionnaire, resulting in varying sample numbers across grades.

Teacher Sample: 10 teachers involved in management - related teaching were interviewed.

### **Phase 2:**

#### Population

There are 173 undergraduate students majoring in Management at the School of Economics and Management, PDSU. Specifically, there are 55 freshmen in one class, 58 sophomores in another, and 60 juniors in the third class (seniors are not on campus due to internships).

#### Sample Group

Using cluster random sampling, 60 junior Management students were selected as the sample. These 60 students from the junior class were divided into two groups: Group A (experimental, 30 students using blended learning) and Group B (control, 30 students using traditional learning).

Experimental Group: Class 1, junior 3, Management Major, Group A (30 students)

Control Group: Class 1, junior 3, Management Major, Group B (30 students)

### **Phase 3:**

#### Population

There are 173 undergraduate students majoring in Management at the School of Economics and Management, PDSU. Specifically, there are 55 freshmen in one class, 58 sophomores in another, and 60 juniors in the third class (seniors are not on campus due to internships).

#### Sample Group

Using cluster random sampling, 60 juniors Management students were selected as the sample. These 60 students from the junior class were divided into two groups: Group A (experimental, 30 students using blended learning) and Group B (control, 30 students using traditional learning).

Experimental Group: Class 1, junior 3, Management Major, Group A (30 students)

Control Group: Class 1, junior 3, Management Major, Group B (30 students)

### **The Variable**

Independent Variable

Blended Learning Model for undergraduate students majoring in Management at Pingdingshan University, Henan Province

### **Dependent Variable**

Learning effectiveness of undergraduate students majoring in Management at Pingdingshan University, Henan Province

### **Contents**

1. Conduct a mixed-methods investigation at PDSU's School of Economics and Management: Distribute questionnaires to 173 Management students (55 freshmen, 58 sophomores, 60 juniors) to analyze blended learning status (individual factors, learning behaviors, environment/resources); interview 10 teachers to explore teaching strategies, platform pain points, and OBE/WebQuest views.

2. Develop an OBE-WebQuest integrated BLM: Design a 6-step initial model, conduct two rounds of IOC verification (5 experts), revise unqualified indicators (initial IOC=0.4 for "diversified resources" and "personalized tasks") to finalize a model with average IOC=0.89, integrating localized cases and micro-teaching assistant functions.

3. Conduct a quasi-experiment with 60 junior Management students (30 in experimental/control groups): Verify pre-test homogeneity ( $p=0.880$ ), implement interventions, and use SPSS for analysis (t-test, ANCOVA, repeated measures ANOVA) with effect size Cohen's  $d=0.64$ .

4. The BLM will be implemented in the 36-hour (30 lecture hours + 6 practical hours) "Personnel Quality Assessment" course (a core compulsory course for juniors), with the following arrangement: Core platform: Micro-teaching assistant (supporting stratified task push, three-dimensional evaluation); Teaching modules: 18 weeks of themed teaching, including OBE goal orientation (knowledge/skill/literacy goals) and WebQuest task-driven learning (e.g., localized cases of Pang Donglai recruitment assessment, role-differentiated collaborative tasks); Evaluation methods: Three-dimensional assessment (automatic platform grading for objective questions, peer blind review for group schemes, joint scoring by teachers and enterprise

mentors for practical tasks); Key focus: The "Personnel Quality Assessment Process" module, with practical sessions focusing on assessment tool selection and scheme design.

### **Time**

The research was conducted from June 2024 to August 2025.

### **Advantages**

1. This study thoroughly examines the current blended learning model for Pingdingshan University undergraduates. It uses student questionnaires and teacher interviews to assess the model's application, strengths, and weaknesses within the college, providing solid data for future model optimization and serving as a reference for designing and developing blended learning models.

2. The research focuses on creating a blended learning model that better suits the college's teaching and students' learning needs. By integrating OBE education concepts and WebQuest learning methods, and leveraging the Weizhujiao platform to enhance teacher-student interaction, it aims to develop an efficient, flexible, and interactive learning environment. This will improve students' learning experiences and outcomes, boosting undergraduate learning effectiveness.

3. Using quantitative research methods, the study evaluates the blended learning model's effectiveness by comparing experimental and control groups' learning outcomes. This confirms its practical value, offers evidence for its promotion within and beyond the college, and supports the ongoing development of higher education teaching models.

### **Definition of Terms**

#### **Blended learning model**

With the rapid advancement of information technology, blended learning has emerged as a novel approach distinct from traditional learning methods. It integrates conventional face-to-face instruction with online learning to deliver a more efficient and flexible experience. In this model, learners receive direct teaching

in the classroom and use online platforms to maximize resource utilization and enhance learning effectiveness. As defined by Garrison and Vaughan (2008), blended learning combines face - to - face teaching with online learning, employing diverse methods and resources to meet individual student needs. It typically includes classroom teaching, online courses, virtual learning environments, digital resources, and project - based learning activities. Notably, this model emphasizes learner participation and autonomous learning in a flexible environment.

The theoretical foundations of blended learning lie in constructivist learning theory, social presence theory, and the technology acceptance model. Constructivist learning theory, such as Vygotsky's Zone of Proximal Development (ZPD), supports scaffolded learning in blended environments. Social presence theory highlights the balanced relationship among cognitive, social, and teaching presence in influencing learning effectiveness. The technology acceptance model focuses on students' perceived usefulness and ease of use, as well as the impact of technology - related anxiety on learning outcomes.

### **WebQuest Learning Method**

WebQuest, a teaching model developed by Professor Dodge from San Diego State University, USA, in 1995, leverages web - based information resources and centers on students to emphasize the cultivation of their inquiry abilities. It combines in - class and out - of - class activities, multiple periods, and interdisciplinary elements. Teachers need to construct a reasonable knowledge - building framework to guide students in cooperation, exploration, and communication. Typically, WebQuest comprises six major components: Introduction, Task, Process, Resources, Evaluation, and Conclusion.

The Introduction sets an engaging learning scenario to motivate students' interest and desire to explore. The Task clarifies the specific objectives and outcomes students need to accomplish, stressing authenticity and complexity to develop their critical thinking and problem - solving skills. The Process details the steps and methods required to complete the task, offering resource - use tips and time - management strategies to help students plan their learning effectively. The

Resources provide carefully selected, theme - related web - resource links to ensure their effectiveness and usability. The Evaluation describes the criteria and methods for assessing students' task completion, focusing on participation and teamwork during the learning process to comprehensively measure their learning outcomes. The Conclusion encourages students to summarize and reflect on their task completion, promoting deeper thinking and transfer of understanding to new contexts. These components highlight not only the teacher's guiding role in designing learning activities but also the learner's active participation, offering students a reconstructive and intensive inquiry - based learning experience.

### **OBE Educational Philosophy**

OBE educational philosophy, which stands for Outcome - Based Education, is a student - centered, outcome - oriented education model. It emphasizes designing courses and teaching activities backwards from final goals to ensure all teaching links serve these predetermined outcomes. This philosophy follows several core principles. First, curriculum design and teaching should focus on students' final learning outcomes. Second, it's necessary to consider individual student differences to guarantee equal learning opportunities. Third, set challenging goals to inspire student potential. Fourth, employ backward design to plan courses from the expected outcomes.

The implementation of OBE usually involves steps like clarifying learning outcomes, building a proper curriculum system, and using diverse teaching strategies and assessment systems. Its advantages include enhancing learning effectiveness, improving educational adaptability, and promoting continuous quality improvement in teaching. Although there are challenges in goal - setting and assessment implementation, OBE has been widely used in engineering, medical, and higher education. PDS College is actively promoting OBE, and teachers are integrating it into their curriculum teaching. This study aims to combine OBE with the WebQuest learning method to design a blended learning model, leveraging the WeChat teaching assistant platform to boost student interaction and learning effectiveness.

### **Effectiveness of Learning**

Learning effectiveness refers to the achievements and progress students make during the learning process. It covers knowledge mastery, skill enhancement, and changes in attitudes and values. It reflects students' gains in specific learning activities and shows how well educational goals are met. Zhu Zhiting and Meng Qi (2003) noted that learning effectiveness focuses not only on test scores but also on students' ability to solve practical problems and their development of non - intellectual factors like study habits. Social Cognitive Theory (SCT) attributes learning effectiveness to student - individual factors (learning motivation, attitude, cognitive ability, strategies), learning - behavior factors (class participation, interaction, self - study time, homework completion), and learning - environment - and - resource factors (class atmosphere, teaching facilities, online platforms, learning materials). For example, motivated students with positive attitudes are more likely to participate actively. Good cognitive abilities and learning strategies help students understand and memorize knowledge better. Active class participation, effective interaction, proper time management, and conscientious homework completion lead to better learning effectiveness. Quality learning environments and resources can boost students' interest and effectiveness.

In summary, learning effectiveness is multi - dimensional. Its assessment requires considering these factors and using various methods. In this study, learning effectiveness will be mainly assessed through cognitive tests, comparing pre - and post - test scores of the sample group to analyze effectiveness improvements.

### **Micro Teaching Assistant platform**

As platforms like Google Classroom, NoteBowl, Schoology, and Geenio are widely adopted in educational settings abroad for their innovative approaches to teaching and learning, China has also begun to integrate classroom interaction information tools into traditional teaching models over the past few years. It is against this backdrop that "WeiZhuJiao" (Micro Teaching Assistant) has emerged and developed as a lightweight solution for enhancing classroom interaction through information technology. Utilizing WeChat as its platform base, it relies on minimal

network services and platform construction, with individual teachers forming the smallest unit of use. This makes it an effective supplement to the broader educational system.

Teachers can easily create courses, upload teaching materials, conduct live or recorded online classes, and assign as well as junior homework assignments through the platform. Equipped with discussion forums, Q&A sections, and polling tools, WeiZhuJiao facilitates communication among teachers and students as well as peer-to-peer interactions. The platform also offers a rich repository of teaching resources and supports personalized recommendations for learning materials to cater to diverse educational needs. Furthermore, supporting multi-device access, students are enabled to learn anytime and anywhere, while detailed learning analytics provided by the platform help teachers accurately understand student progress and performance. With its user-friendly operation, comprehensive features, and strong interactivity, WeiZhuJiao serves as an invaluable aid for both teaching and learning, especially suitable for blended learning scenarios. It effectively enhances teaching outcomes and learning experiences.

### **Undergraduate Students**

The population of this study consists of undergraduate students enrolled at the School of Economics and Management, PDS College, in Henan Province, China.

### **Research Framework**

This study employs a mixed-methods approach and is divided into three phases. The first phase corresponds to the completion of the first research objective, which is to investigate the current status of blended learning models among undergraduate students at Pingdingshan University. The second phase aligns with the second research objective, involving the development of a blended learning model for university students. The third phase corresponds to the third research objective, which is to evaluate the effectiveness of the blended learning model in enhancing students' learning outcomes. The outcome of this study is the construction of an inquiry-collaborative blended learning model that integrates Outcome-Based

Education (OBE) principles and the WebQuest learning method, resulting in improved learning outcomes compared to pre-experiment conditions. The research framework design is illustrated in Figure 1.1:

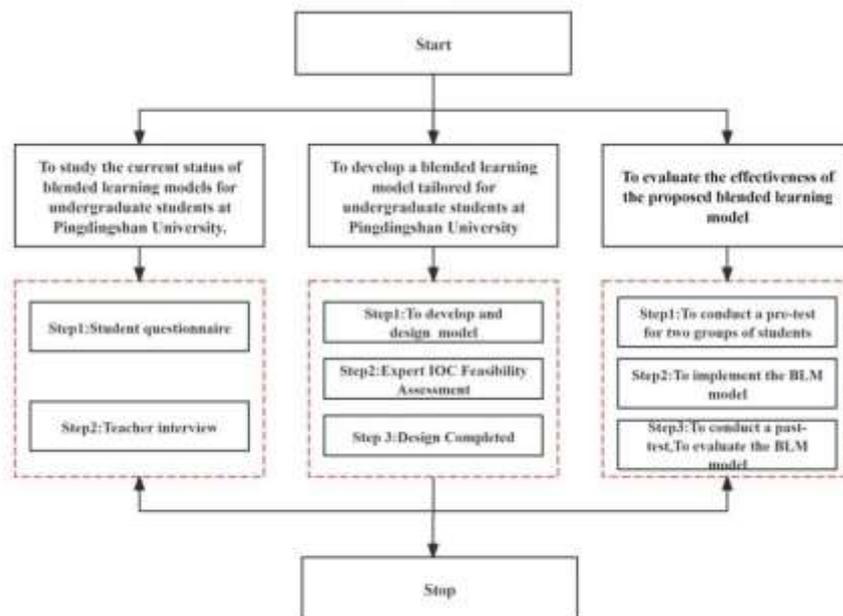


Figure 1.1 Research Framework

## Chapter 2

### Literature Review

The literature review presents the related literatures and researches that help researcher to review, analyze and synthesize the key concepts of both dependent and independent variables of the present study. This chapter covers six areas as follow:

1. Effectiveness of Learning
2. Blended learning model
3. WebQuest Learning Method
4. OBE Educational Philosophy
5. Related Research
6. The principles of this study's model

The details are as follows.

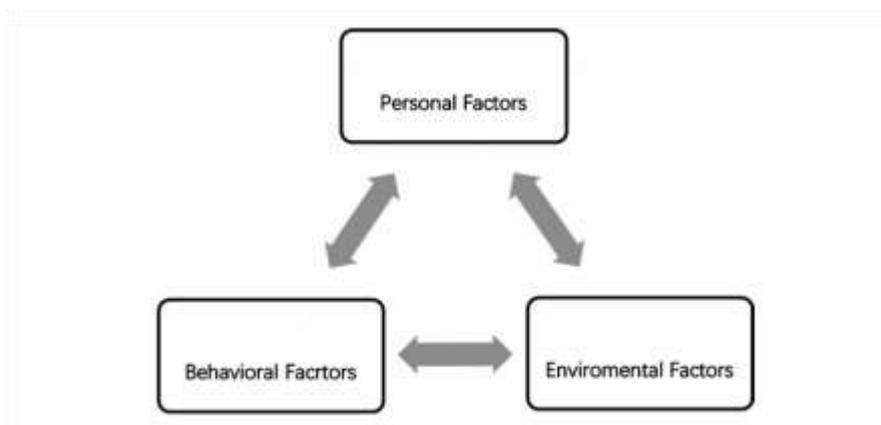
#### **Effectiveness of Learning**

##### **Definition**

Learning outcomes refer to the achievements and progress students make during their learning process, encompassing the acquisition of knowledge, enhancement of skills, and changes in attitudes and values. These outcomes reflect the gains and growth students experience through specific learning activities or courses, serving as concrete indicators of the extent to which educational objectives have been achieved. According to the research by Zhiting Zhu and Qi Meng (2003), learning outcomes not only focus on students' performance in exams or tests but also emphasize their ability to apply acquired knowledge to solve real-world problems, as well as the development of learning habits and strategies-non-cognitive factors-that emerge during the learning process.

### Influencing Factors

This study is grounded in Social Cognitive Theory (SCT). Proposed by Albert Bandura, the founder of SCT, the theory posits that learning can occur through observation and modeling. Target behaviors or acquired outcomes are the result of interactions between personal, behavioral, and environmental factors, as illustrated in Figure 2.1. The model for the development of self-regulated learning ability is based on social cognitive learning theory (person, behavior, and environment) and incorporates these three elements.



**Figure 2.1** Factors Influencing Learning Outcomes

According to Social Cognitive Theory, we can conclude that learning outcomes are influenced by a combination of personal factors, behavioral factors, and environmental factors.

**Personal Factors in Learning:** Individual learner factors such as students' motivation, attitude towards learning, cognitive abilities, and learning strategies significantly impact learning outcomes. For example, students with strong learning motivation and a positive attitude toward learning are more likely to actively participate in learning activities, thereby achieving better learning outcomes. Moreover, good cognitive abilities and effective learning strategies help students understand and retain knowledge more efficiently, improving both the efficiency and quality of their learning.

Behavioral Factors in Learning: Behavioral performance during the learning process is another critical factor influencing learning outcomes. This includes classroom participation, interaction levels, time invested in self-study, and homework completion. Students who actively engage in classroom discussions, interact effectively with peers and teachers, manage their self-study time wisely, and complete assignments diligently tend to better understand and master the material, leading to improved learning outcomes. Additionally, student behavior is influenced by both personal and environmental factors; for instance, highly motivated students are more likely to engage in learning activities, while a supportive learning environment can stimulate student engagement.

Learning Environment and Resources: The learning environment encompasses classroom atmosphere, teaching facilities, and online learning platforms, while learning resources include textbooks, reference books, online courses, and multimedia materials. A well-supported and conducive learning environment, along with rich and high-quality educational resources, provides better conditions for students, stimulates their interest in learning, and enhances their learning outcomes.

### **Evaluation Dimensions**

Garrison, D.R. (1997) extensively explored the concept of self-directed inquiry learning, emphasizing the importance of learners' cognitive abilities and practical skills in the learning process. He proposed that learning outcomes can be assessed through two key dimensions:

**Cognitive Achievement:** The learner's understanding and absorption of the learning content. Assessments such as tests, exams, or other evaluation methods can measure the degree of knowledge mastery.

**Skill Enhancement:** Improvement in specific skills, including practical skills and problem-solving abilities. Skill enhancement often manifests in the learner's ability to apply knowledge to real-world situations or new problems.

Evaluation Metrics For the two dimensions of cognition and skills:

Cognitive Assessment: Standardized tests and coursework can be used to evaluate cognitive aspects.

Skill Enhancement: Projects, practical work, or case studies can assess skill development. This multi-faceted assessment approach provides a comprehensive view of the learner's actual learning situation.

Wang Yiqin and Qi Yue (2002) discussed evaluation dimensions for learning behaviors in their research, including post-class assignment scores, submission rates for assignments, unit test scores, submission rates for unit tests, mid-term exam scores, and final exam scores. They noted that these quantitative metrics facilitate reasonable formative assessments by teachers and encourage learners to actively participate in the learning process, promoting improvement in learning levels.

In this study, the evaluation of learning outcomes primarily focuses on post-learning test scores. This choice is based on the following considerations: Test scores serve as a direct, objective quantitative measure that accurately reflects students' mastery of learned knowledge and their application of skills, making them particularly suitable for assessing academic achievement in specific courses or learning modules. By designing scientifically rigorous test papers, key points and difficult areas of the curriculum can be comprehensively covered, ensuring the validity and reliability of test results. Furthermore, test scores are relatively easy to obtain, facilitating data collection and analysis, providing clear and intuitive quantitative results. This approach supports an objective assessment of the effectiveness of blended learning models.

### **Measurement Methods**

#### Quantitative Measurement Methods

Quantitative measurement methods primarily use numerical data to assess learning outcomes, characterized by their objectivity and strong comparability. Common quantitative measurement methods include:

Test Scores: By designing scientifically sound test questions, measure students' mastery of knowledge and their ability to apply skills. Test scores can directly reflect students' learning outcomes on specific knowledge points or skill

areas, making them one of the most direct and commonly used indicators in learning outcome assessments.

**Questionnaires:** Collect subjective data such as students' learning attitudes, study habits, and self-efficacy through designed questionnaires. Analyzing the relationship between these factors and learning outcomes provides comprehensive data for evaluating learning outcomes, offering rich quantitative evidence.

**Learning Analytics:** Utilize big data, data mining, and artificial intelligence technologies to collect, analyze, and model students' online learning behavior data. By deeply analyzing multi-modal process data such as login frequency, study duration, video viewing progress, and assignment completion on learning platforms, dynamic monitoring and precise assessment of students' learning outcomes can be achieved. This provides timely teaching feedback and intervention bases for educators.

#### Qualitative Measurement Methods

Qualitative measurement methods focus on qualitative descriptions and in-depth analyses of learning outcomes, revealing individual differences, emotional experiences, and learning strategies that are difficult to quantify. Main qualitative measurement methods include:

**Interviews:** Conduct face-to-face or telephone interviews with students to gain a deep understanding of their comprehension of learning content, difficulties and challenges encountered during the learning process, application of learning strategies, and evaluations of teaching methods. Interviews provide rich qualitative data by capturing students' true thoughts and feelings.

**Case Studies:** Select representative learning cases and conduct in-depth analyses of students' assignments, project reports, and classroom performance. Evaluate students' abilities to integrate and apply knowledge and skills in real-world scenarios, along with higher-order learning outcomes such as innovation and critical thinking.

**Observation:** Teachers or researchers observe students' participation, interaction, and learning behaviors in classrooms or learning activities, record and

analyze these observations to assess non-cognitive learning outcomes such as learning attitudes, study habits, and teamwork skills.

#### Learning Outcomes as Core Educational Goals

Learning outcomes, as core educational goals, are influenced by various factors and can be assessed from multiple dimensions. In practical research and teaching practices, it is essential to comprehensively consider the definition, influencing factors, evaluation dimensions, and measurement methods of learning outcomes to select appropriate ways for a holistic assessment.

In this study, test scores are used as the primary evaluation indicator for learning outcomes. The analysis of pre- and post-test score differences among sample groups aims to reveal the impact of blended learning models on students' academic achievements through objective, quantifiable data.

### **Blended learning model**

#### **Definition**

Blended learning is a mode that combines online learning with face-to-face instruction. Its core lies in integrating internet-based teaching with traditional in-person teaching to fully utilize time and space for personalized education. Blended learning is not simply the addition of online and offline teaching activities; rather, it leverages network learning platforms and educational software to provide students with rich learning resources such as e-textbooks, instructional videos, online tests, and discussion forums. Students can independently schedule their online learning according to their own time and learning pace, enabling them to preview, review, and extend their knowledge. The academic definition of blended learning has undergone three significant iterations:

Technology Integration Perspective: Early scholars like Clark (2003) defined it as "the combination of face-to-face teaching with computer-assisted instruction," emphasizing the physical integration of technological tools (Clark, 2003, Educational Technology).

Instructional Redesign Perspective: Garrison and Vaughan (2008) proposed that "blended learning is a systematic approach that restructures the temporal and spatial relationships between teaching and learning through carefully designed online and in-person classroom interactions," highlighting the critical role of instructional design (Garrison & Vaughan, 2008, *Blended Learning in Higher Education*).

Ecological Adaptation Perspective: The latest meta-analysis by Picciano (2021) defines blended learning as "an adaptive system based on specific educational ecosystems, achieving personalized learning paths through dynamic allocation of teaching elements," emphasizing context sensitivity and dynamic balance (Picciano, 2021, *Journal of Online Learning Research*).

From the learner's perspective, blended learning aims to enhance learning outcomes and experiences by combining online and offline approaches. Its goal is to comprehensively improve students' learning and development, using offline teaching as the main thread while leveraging the convenience and resource richness of online platforms to empower classroom instruction.

### **Theoretical Foundation**

The theoretical foundations of blended learning stem from three major domains:

#### Constructivist Learning Theory:

Vygotsky's Zone of Proximal Development (ZPD) theory provides the basis for scaffolded learning in blended environments. Driscoll (2002) confirms that blended models are more conducive to timely interventions during cognitive conflicts. This theory emphasizes the importance of social interaction and collaboration in learning, suggesting that learners can achieve higher levels of understanding with appropriate guidance and support.

This aligns with both WebQuest (which relies on scaffolded inquiry to resolve cognitive conflicts) and OBE (which uses backward design to ensure support aligns with desired outcomes). Constructivism thus serves as a shared theoretical bridge, justifying why BLM's integration of online/offline interactions can amplify the effectiveness of WebQuest's inquiry activities and OBE's outcome-oriented goals.

#### Social Presence Theory:

Short et al. (1976) introduced the concept of media social presence, which was further developed by Garrison (2000) into the "Community of Inquiry Framework." This framework demonstrates that the balance between cognitive presence, social presence, and teaching presence in blended environments directly influences learning outcomes. It highlights the importance of creating a supportive and interactive learning community where students feel connected and engaged.

Social presence theory explains how BLM's online discussion forums (for WebQuest collaboration) and offline classroom interactions (for OBE outcome reviews) collectively strengthen learner engagement—addressing a key limitation of standalone online or offline models in sustaining long-term inquiry motivation.

#### Technology Acceptance Model:

Davis (1989) proposed the theory of perceived usefulness and ease of use, which has been extended in the context of blended learning research. Venkatesh's (2003) Unified Theory of Acceptance and Use of Technology (UTAUT) model indicates that technology anxiety levels play a crucial role in determining how effectively students adopt and utilize technological tools in their learning process.

This model supports the integration of WebQuest (which relies on digital resources) into BLM: by ensuring online platforms are user-friendly, BLM reduces technology barriers, allowing WebQuest's inquiry activities to focus on knowledge construction rather than technical operation—consistent with OBE's goal of removing obstacles to outcome achievement.

#### Core Principles Described by Driscoll (2002)

In Driscoll's (2002) description of various forms of blended learning, he outlines three core principles:

(1) Combining Teacher-Dominated Roles with Student-Centered Learning: The core philosophy of blended learning integrates teacher-led instruction with student-centered learning. For example, in European Reconstruction Program (ERP) training, students engage in self-directed online learning to deeply understand project content, followed by assessments and discussions facilitated by instructors.

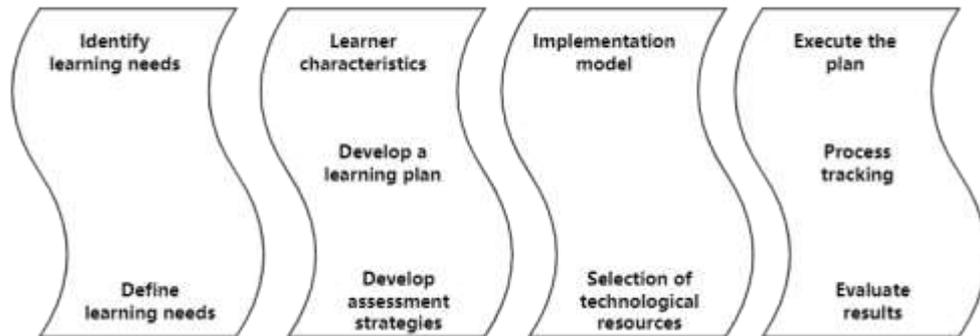
This approach ensures that students receive structured guidance while also having the autonomy to explore and deepen their understanding independently. This principle directly supports the integration of OBE and WebQuest: OBE's "clear focus" on outcomes guides teachers' instruction, while WebQuest's student-led inquiry thrives in the student-centered space BLM provides.

(2) Nature of Blended Learning Research as a Study of Information Transmission Channels: The essence of blended learning research lies in studying information transmission channels—investigating which channels most effectively promote knowledge acquisition and learning outcomes. The choice of learning channels should align with learners' styles to achieve effective learning. Additionally, blended learning focuses on information transmission throughout the learning process, not just the technological means by which it is delivered. This principle justifies why WebQuest (with its structured online inquiry) and OBE (with outcome-driven offline activities) complement each other in BLM: WebQuest optimizes online information transmission for inquiry, while OBE ensures offline channels align with outcome mastery, creating a seamless information flow.

(3) Critical Role of Media Selection and Combination: Blended learning builds on considerations of online learning, aiming to leverage its advantages while achieving high efficiency with minimal input. According to Schramm's media selection strategies, blended learning should adhere to the principle of "minimum cost for maximum value." This involves considering factors such as development time, resource costs, and levels of learning application when selecting and combining media to achieve optimal learning outcomes. This principle informs how OBE and WebQuest are operationalized in BLM: OBE's "expanded opportunities" require diverse media to meet individual needs, while WebQuest's reliance on curated online resources (e.g., videos, databases) fits BLM's cost-effective media combination, ensuring resources align with both inquiry goals and outcome requirements.

#### Process of the blended learning model

Josh Bersin (2004) suggests that the blended learning process primarily consists of four fundamental elements (as illustrated in Figure 2.2).



**Figure 2.2** The Basic Process of Blended Learning

#### Identify and Define Learning Needs

In blended learning, it is essential to identify and define the learning needs. This step is guided by OBE's "backward design": learning needs are derived from the ultimate outcomes students are expected to achieve, ensuring BLM's direction aligns with OBE goals. WebQuest's inquiry themes are also selected based on these needs to ensure relevance.

#### Develop Learning Plans and Assessment Strategies Based on Learners' Characteristics

Learners' characteristics encompass various aspects, such as learning styles (e.g., field-dependent or field-independent), existing knowledge and skill structures, and intelligence levels (IQ). Blended learning requires the formulation of adaptive learning plans and specific assessment strategies based on these learner characteristics. WebQuest's group roles and task differentiation (e.g., researchers, presenters) are integrated here to address diverse characteristics, while OBE's "expanded opportunities" ensure assessment strategies (e.g., peer reviews, project evaluations) accommodate different learning paces.

#### Determine the Development or Selection of Learning Content Based on the Facilities (Environment) for Implementing Blended Learning

The basic form of blended learning is a combination of face-to-face and online learning. OBE's outcome standards guide content selection (e.g., prioritizing topics critical to skill mastery), while WebQuest's resource section (curated online

links, textbooks) provides the content backbone, ensuring offline (classroom) and online (platform) content are mutually reinforcing.

#### Execute the Plan, Track the Process, and Measure the Results

This process is the final stage of blended learning, primarily focusing on implementing the learning plan, tracking the learning process, and measuring learning outcomes to determine whether the expected objectives have been achieved. WebQuest's process section (step-by-step inquiry guidance) structures online execution, while OBE's "progressive achievement" principle informs tracking (e.g., milestone checks) and measurement (e.g., comparing post-test scores to predefined outcomes).

Based on the description of the above process, we can break down blended learning design into eight components. These eight components form a continuous improvement cycle, as illustrated in Figure 2.3, with specific tasks for each step:

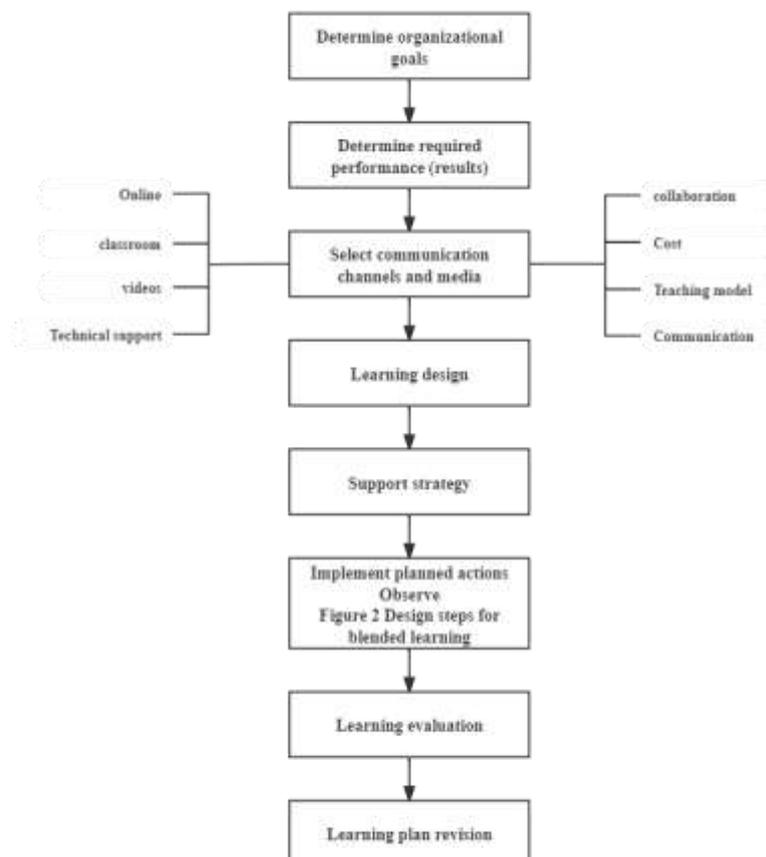


Figure 2.3 Steps in the Design of Blended Learning

### 8-Step Blended Learning Design

1. Define Objectives: Derive from OBE's ultimate outcomes to align BLM with student learning needs. 2. Determine Expected Performance: Operationalize abstract OBE outcomes into concrete WebQuest tasks (e.g., "complete a case analysis report"). 3. Choose Delivery Channels: Select learning modes/media (online classrooms, collaboration, live e-learning) while considering effectiveness and cost. 4. Learning Design: Collaborate with course/educational/technical experts to integrate WebQuest's six frameworks with OBE's backward design. 5. Support Strategies: Provide WebQuest scaffolding (e.g., step-by-step guides) and OBE personalized interventions (e.g., extra resources for struggling students). 6. Action Observation: Design forms to record key items during implementation. 7. Learning Evaluation: Conduct diagnostic/formative/summative evaluation using WebQuest's inquiry rubrics and OBE's outcome metrics (e.g., test scores). 8. Revise Learning: Update the plan based on evaluation results for subsequent cycles.

### Application Models of Blended Learning

Proposed by Purnima and Valiathan, main models integrate OBE and WebQuest as follows: Skill-Driven Model: Combines self-paced autonomous learning with online teacher guidance; uses OBE's skill outcomes to design WebQuest tasks. Attitude-Driven Model: Integrates traditional classroom learning with online collaboration; leverages WebQuest's collaborative activities to foster OBE's attitude outcomes. Competency-Driven Model: Involves learners collaborating with experts online to acquire tacit knowledge; aligns WebQuest's expert interactions with OBE's competency standards.

## WebQuest Learning Method

### Explanation

The WebQuest teaching model, pioneered by Professor Dodge and colleagues at San Diego State University in 1995, is a student-centered instructional approach that relies on internet information resources and emphasizes the development of inquiry skills. The WebQuest model is characterized by the

combination of in-class and out-of-class activities, multiple class sessions, and interdisciplinary integration, requiring teachers to build a reasonable framework for knowledge construction and guide students to learn collaboration, inquiry, and communication. WebQuests can generally be classified into short-term and longer-term formats; short-term WebQuests are suitable for units with fewer class sessions, while longer WebQuests last from one week to two months, focusing on knowledge expansion and refinement.

The core idea of WebQuest is student-centered, with teacher activities playing a supporting role, transitioning students from passive to active learning. Through various forms of learning activities, it aims to enhance students' comprehensive qualities, improve their ability to independently acquire information and knowledge, and boost their autonomous learning and creative thinking skills (Wang, 2005, p.2).

### **Theoretical Framework**

The main characteristics of WebQuest include:

**Inquiry-Oriented:** WebQuest is a teaching activity that focuses on "thematic investigation," "thematic research," "thematic exploration," or "thematic orientation." In such teaching activities, some or all of the information interacting with students comes from online resources.

**Task-Driven:** WebQuest requires students to engage in inquiry-based learning centered around tasks within an online environment.

**Collaboration and Communication:** WebQuest encourages students to cooperate, inquire, and communicate through collaborative thinking methods.

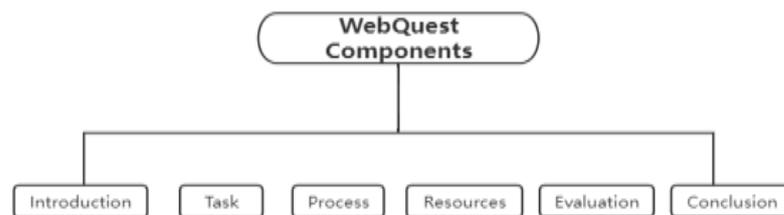
**Integration of In-Class and Out-of-Class Learning:** The WebQuest teaching model features characteristics of integrating in-class and out-of-class activities, multi-session combinations, interdisciplinary approaches, multiple participant inclusions, and various forms of engagement.

**Teacher's Role:** In WebQuest, the teacher needs to build a reasonable and effective framework for knowledge construction, guiding students in autonomous

learning and helping them learn methods of cooperation, inquiry, and communication.

These characteristics align with BLM's integration of online/offline learning and OBE's student-centeredness: WebQuest's inquiry orientation is amplified by BLM's flexible online resources, while its task-driven nature ensures activities align with OBE's predefined outcomes.

WebQuest is a deconstructive design for learning activities, consisting of multiple framework components that help guide the teaching and learning process. The following are the six main frameworks of WebQuest:



**Figure 2.4** Components of WebQuest

#### Introduction Section

According to Dodge (1995), a good introduction can set an engaging learning environment, demonstrating relevance and importance to students. During the introduction stage, teachers should clearly articulate the purpose of the task, encouraging students to think, for example, by using interesting stories or provocative questions to capture their attention and motivate their participation in the process. Designers will set up specific problem scenarios to help students understand the current learning context. The scenarios should align with the interests of the students and closely connect to their life experiences. Psychological research indicates that the features of a problem are a major factor affecting problem-solving. Describing specific scenarios to students can help them better solve problems and assist them in completing tasks. Therefore, the description of the introductory scenario should

gradually shift from the background to the question to be explored, sparking students' curiosity for inquiry and motivating them to complete subsequent tasks. The introduction is aligned with OBE's "clear focus": scenarios are designed to reflect the relevance of ultimate outcomes (e.g., "How can marketing strategies solve real business problems?" for a business course), ensuring inquiry aligns with what students need to achieve.

#### Task Section

The task is the core component of the WebQuest, clearly defining the specific objectives and outcomes that students need to accomplish. According to Dodge (1995), tasks should have authenticity and complexity, requiring students to use critical thinking and problem-solving skills. When designing tasks, teachers must ensure that students have clear goals, and the tasks should be adjusted to fit the students' learning levels, challenging their abilities while ensuring feasibility. Blumenfeld et al. (1991) emphasize that the authenticity of tasks is crucial for learning motivation, and specific, practical tasks motivate students more effectively. The setup of the tasks should be based on the chosen theme, with the WebQuest tasks module providing concrete descriptions of the thematic objectives to be studied, assigning specific learning tasks to each member of the group to ensure that all members participate in the problem-solving process. The completion of tasks is not merely about answering questions but involves a process of comparison, categorization, deduction, analysis, and building support, ultimately leading to abstraction. Teachers need to provide specific tasks to facilitate students' subsequent collaborative learning. Tasks are derived from OBE's learning outcomes: for example, if an OBE outcome is "master data analysis for market research," the WebQuest task might be "collect online market data, analyze trends, and present a report"—making outcomes actionable. BLM supports this by providing both online tools (data platforms) and offline guidance (teacher feedback on analysis methods).

#### Process Section

The process outlines the steps and methods that students need to follow to complete the task. O'Neill & McMahon (2005) point out that a clear and detailed

process section can reduce students' confusion, allowing them to plan their learning paths more effectively. The process section should cover resource usage skills, time management strategies, and collaboration. Harris & Rea (2009) mention that with clear steps and guidance, WebQuest can help students enhance their self-regulation abilities, thereby improving the effectiveness of autonomous learning. The steps structured in this section act as "scaffolding" in the task completion process, breaking down complex tasks into manageable parts so that learners can complete them easily and flexibly apply their acquired knowledge to better achieve their goals. At each stage, teachers will explain in detail how to complete specific tasks and provide suggestions and guidance.

A. Preparation Stage: The teacher distributes group worksheets, and group members negotiate their roles and elect a group leader. The group leader leads the group in planning the task activities and defining individual research tasks.

B. Group Research Stage: Each student can search for and obtain the necessary information using internet resources provided by the teacher. To better complete the task, students are encouraged to create a dedicated folder within the group for storing resources. Students will interact with classmates and teachers through a QQ group, discussing their learning progress and presenting results in formats such as PPT or Word.

C. Reporting and Integration Stage: Group representatives report on the group's learning outcomes, while other groups and teachers evaluate them. Ultimately, all members participate in refining the course content to form an inquiry report.

The process leverages BLM's online-offline integration: online platforms (e.g., QQ groups) facilitate asynchronous collaboration, while offline reporting aligns with OBE's "progressive achievement" (allowing milestone checks). Scaffolding in the process also supports OBE's "expanded opportunities" by accommodating different learning paces.

### Resource Section

The resource section provides students with a list of materials and web resources needed to complete the task. According to Dodge (1995), resources should be rigorously selected to be effective and relevant to assist students in successfully completing the task. Hsu et al. (2015) point out that the availability and accessibility of resources are crucial for promoting students' independent exploration, and suitable resources can enhance learners' autonomy. Teachers carefully select reliable, high-quality online resource links relevant to the theme. These resources can take the form of websites, electronic publications, textbooks, and videos. The resource section aims to meet the learning needs of students at various levels by providing multiple means of information acquisition. This part significantly reduces the time required for collecting and filtering information, allowing for adequate preparation for focused processing and analysis of information. Resources are curated to align with OBE outcomes and BLM's media efficiency: for example, if an outcome is "understand international trade policies," resources might include online government databases (for BLM's online access) and textbook chapters (for offline review), ensuring relevance and accessibility.

### Evaluation Section

The evaluation section describes the criteria and methods for assessing students after completing the task. According to Andrade (2000), detailed evaluation criteria can help students better engage in self-assessment. Frey & Schmitt (2007) emphasize that evaluation should not only include final juniors but also focus on students' levels of participation and teamwork during the learning process, which constitutes a more comprehensive learning outcome. The learning that occurs through WebQuest not only enables students to acquire knowledge content but also fosters higher-level thinking abilities. Therefore, accurately and objectively measuring students' learning outcomes and performance is essential. Generally, evaluation rubrics can be used to assess learning performance, and the evaluation can be carried out by teachers, group members, or the students themselves. Clear evaluation criteria can inform students about which behaviors will receive

corresponding assessments. Evaluation integrates OBE's outcome focus and BLM's multi-dimensionality: rubrics assess both WebQuest's inquiry process (e.g., collaboration quality) and OBE's outcomes (e.g., report accuracy), using BLM's online tools (e.g., shared rubrics) for transparency.

#### Conclusion Section

In this section, teachers guide students to summarize and reflect on their task completion status and lead them to review the learning content as well as any areas still lacking during the learning process, encouraging students to think more deeply about the issues and to expand and transfer their thinking to different dimensions and fields. The conclusion connects back to OBE's "continuous improvement": reflections focus on gaps between current performance and ultimate outcomes, informing BLM's revised plans for subsequent learning cycles.

Through the six frameworks (introduction, task, process, resources, evaluation, conclusion), WebQuest provides learners with a restructured and intensive inquiry learning experience. These frameworks not only highlight the guiding role of teachers in designing learning activities but also reflect the active participation of learners in the learning process. By integrating perspectives from different experts, we can gain a deeper understanding of the significant value of WebQuest in promoting students' learning and blended learning models.

### **OBE Educational Philosophy**

As early as 2003, Professor Jiang Bo provided an in-depth explanation of the origins and essence of the OBE philosophy. He noted that the OBE philosophy has developed into a relatively complete theoretical system and implementation model, achieving three important transformations: shifting from course-oriented to outcome-oriented, from teacher-centered to student-centered, and from quality monitoring to continuous improvement (Jiang Bo, *Outcome-Based Education*, p. 36). A distinctive feature of this philosophy is its adherence to the principle of backward design. Curriculum developers start by identifying the professional needs and defining the expected learning outcomes that students should achieve. They focus on the results

of a series of learning activities, i.e., what outcomes students will achieve and what abilities they will acquire after completing their studies, and whether these meet societal demands for student capabilities. Then, starting with the expected learning outcomes, they reverse-plan and design the curriculum. Throughout the teaching process, students are at the center, given more space for self-exploration and self-learning. Moreover, outcome-oriented education is a continuous improvement process, where teaching practices are refined based on student performance and feedback.

Entering the 21st century, with the rapid development of information technology, the OBE philosophy has been integrated with IT, leading to the formation of student-centered, outcome-oriented blended teaching models.

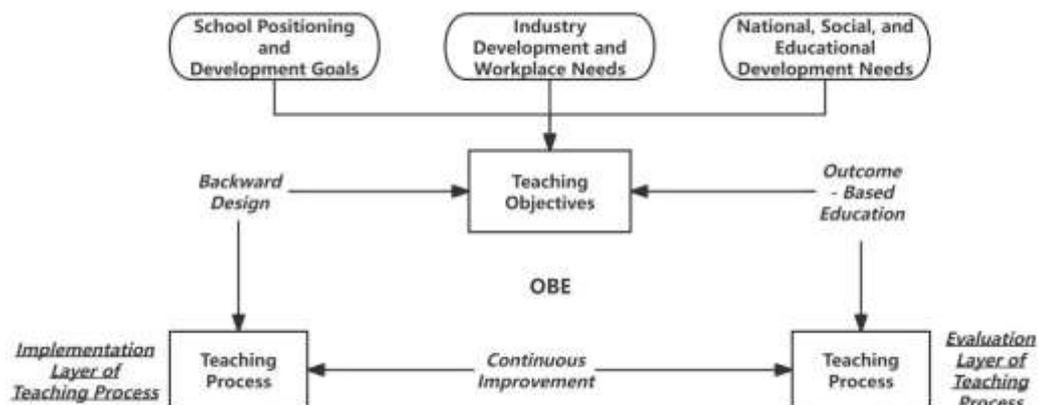


Figure 2.5 OBE Philosophy

#### Core Principles of OBE

The core principles of the Outcome-Based Education (OBE) philosophy include: Clear Focus

Curriculum design and teaching should clearly focus on the ultimate learning outcomes that students are expected to achieve upon completion of their studies. Students should also be guided to focus their learning goals on these outcomes. This principle guides the integration of BLM and WebQuest: BLM's

online/offline activities are designed to directly contribute to outcomes, while WebQuest's tasks are framed to reflect these outcomes (e.g., "Master financial analysis" becomes "Complete a company financial report via online data and offline discussions").

#### Expanded Opportunities

Curriculum design and teaching should take into account individual differences among students, ensuring that every student has the opportunity to achieve the learning outcomes. BLM supports this through flexible online learning (accommodating different paces) and offline tutoring, while WebQuest's group roles (e.g., researcher, presenter) allow students to contribute based on strengths—ensuring no one is excluded from achieving outcomes.

#### Higher Expectations

Teachers should raise their expectations for student learning, setting challenging performance standards that encourage deep learning. WebQuest's complex, authentic tasks (e.g., solving real community issues) meet these expectations, while BLM's combination of online research (independent exploration) and offline debates (critical thinking) fosters deep learning required by OBE.

#### Backward Design

Starting from the ultimate goal (final learning outcomes or peak outcomes), reverse-design the curriculum to ensure that all teaching activities align with these outcomes. This principle structures the integration: OBE outcomes define WebQuest's task themes and BLM's resource selection (e.g., if the outcome is "ethical decision-making," WebQuest tasks involve analyzing online case studies, and BLM includes offline role-plays to practice decisions).

### **Implementation Steps**

Implementing the OBE philosophy typically involves the following steps:

#### Define Learning Outcomes

Clearly define the final learning outcomes that students should achieve upon completing their studies. These outcomes should be clearly articulated and measurable either directly or indirectly.

#### Construct Curriculum Framework

Build the curriculum framework based on the defined learning outcomes, ensuring that each course contributes specifically to achieving the desired competency structure.

#### Determine Teaching Strategies

Emphasize personalized teaching, focusing on what students have learned rather than what teachers have taught. Adopt a research-based teaching model rather than a rote-learning approach.

#### Self-Referenced Evaluation

Focus teaching evaluations on learning outcomes, using diverse and tiered evaluation criteria that emphasize individual learning progress.

#### Progressive Achievement

Divide the learning process into different stages, setting clear learning objectives for each stage to ensure that students ultimately achieve the peak outcomes.

These steps are operationalized through BLM and WebQuest: Step 1-2 define WebQuest's inquiry themes and BLM's content scope; Step 3 uses WebQuest's student-centered inquiry and BLM's personalized support; Steps 4-5 rely on BLM's process tracking and WebQuest's rubrics to monitor progress toward outcomes.

#### **Advantages and Challenges**

PDS College's Advocacy for OBE, PDS College has been actively advocating the OBE philosophy, and through teacher interviews, it has been found that educators are integrating this philosophy into their curriculum. This study aims to design a blended learning model that combines the OBE philosophy with the WebQuest learning method, while leveraging the MicroTeaching platform to increase student interaction and discussion, thereby enhancing student engagement and learning outcomes.

#### Combining OBE Philosophy and WebQuest Learning Method:

By clearly defining learning outcomes and constructing a rational curriculum framework, we ensure that teaching activities align with the ultimate learning goals. WebQuest, as a structured online inquiry activity, provides students with rich learning resources and exploration opportunities, promoting their understanding and application of knowledge.

#### Enhancing Interaction via the MicroTeaching Platform:

The MicroTeaching platform offers features such as online discussions, polls, and daily quizzes, which enhance interactions between teachers and students, as well as among students themselves, thereby increasing student engagement. These interactive features help shift students from passive to active learners, enabling them to better absorb and understand knowledge. Additionally, students can share learning experiences and resolve issues encountered during their studies more effectively.

#### Promoting Student Engagement and Learning Outcomes:

The blended learning model combines the strengths of both online and offline learning, providing flexible learning methods while retaining the interactivity and guidance of face-to-face instruction. This approach helps boost student motivation, cultivate autonomous learning skills, and ultimately improve overall learning outcomes.

Through this research approach, we aim to provide PDS College students with a more efficient and interactive learning model. Furthermore, this study seeks to offer valuable insights and references for educational reforms at other institutions of higher education.

### **Related Research**

WebQuest, blended learning, and OBE are all beneficial for student learning. WebQuest cultivates high - order thinking via web resources and structured inquiry. Blended learning offers personalized and diverse experiences by combining online and offline elements. OBE optimizes teaching design and assessment by defining

expected learning outcomes. Combining these three approaches in teaching can potentially maximize learning effectiveness.

Janet Watson (2001): In "WebQuests: A Resource for K - 12 Teachers", Watson states WebQuest can motivate students, making learning active and meaningful.

Robert Marzano (2005): Marzano's team found that in classes using WebQuest teaching strategies, students' academic performance and critical thinking, especially in science and social studies, improved significantly.

Charles D. Dziuban (2018): Dziuban's team, in "Blended Learning: The New Normal and Emerging Technologies", notes that blended learning is now common in higher education, improving students' learning results and satisfaction.

Yang Shuxin (2024): In "Machine Learning" teaching, Yang integrates OBE, rebuilding teaching content, strengthening practice, and optimizing process assessment. This teaching system focusing on model optimization and scene analysis improves student learning effectiveness.

Chaiyasit (2023): Chaiyasit's latest study shows that a blended teaching mode with self - study improves students' self - study ability. Post - course academic performance is higher than pre - course, and students prefer this mode, with self - study ability being a key factor in blended teaching effectiveness.

González - Gómez, D. (2016): González - Gómez and collaborators studied blended learning in university, especially in mobile learning environments. Results show blended - learning students have better self - study, knowledge mastery, and learning outcomes, and improved self - management and thinking abilities.

Hwang and Chang (2011): Their study on mobile and blended learning indicates that combining online and blended learning in mobile environments enhances self - study ability and learning outcomes, allowing students to choose learning methods based on personal needs and styles.

Kuo, Y.-C. (2014): Kuo's research on college students' blended learning, especially in mobile contexts, shows it boosts self - study motivation and ability, especially when using portable devices for online learning.

While existing studies highlight the individual benefits of WebQuest, BLM, and OBE, few explore their synergistic integration: OBE's outcome focus addresses BLM's potential lack of direction; WebQuest's structured inquiry remedies BLM's risk of unguided online learning; BLM's flexibility solves OBE's challenge of accommodating diversity. This integration is particularly underexplored in Henan Province, where regional educational contexts (e.g., resource accessibility, student demographics) necessitate localized models.

In summary, while existing research has explored the benefits of blended learning and autonomous learning, there is a lack of studies focusing on the integration of WebQuest into blended learning models, particularly in the context of Henan Province. This study aims to fill this gap by developing and evaluating a WebQuest-based blended learning model tailored to the needs of college students in Henan.

By integrating these three approaches—WebQuest for fostering higher-order thinking, blended learning for personalized and diverse experiences, and OBE for outcome-oriented teaching and assessment—educators can create a comprehensive and effective learning environment. This combination not only enhances students' academic performance but also equips them with the skills necessary for lifelong learning and success in a rapidly changing world.

### **The principles of this study's model**

By analyzing and reviewing relevant literature, we can integrate the principles of the WebQuest learning method and OBE philosophy. This allows us to develop more scientific and effective learning plans and blended learning models, which can enhance students' learning outcomes and skill development. The integration of OBE and WebQuest combines outcome - based goals with web - based inquiry to enhance learning. OBE offers clear learning objectives and backward - design curriculum, ensuring teaching activities align with expected outcomes. WebQuest stimulates cognitive conflict and self - directed learning through structured inquiry and resources. Together, they optimize teaching design and strengthen

students' abilities in knowledge acquisition, understanding, application, and critical thinking, significantly improving learning achievement and experience

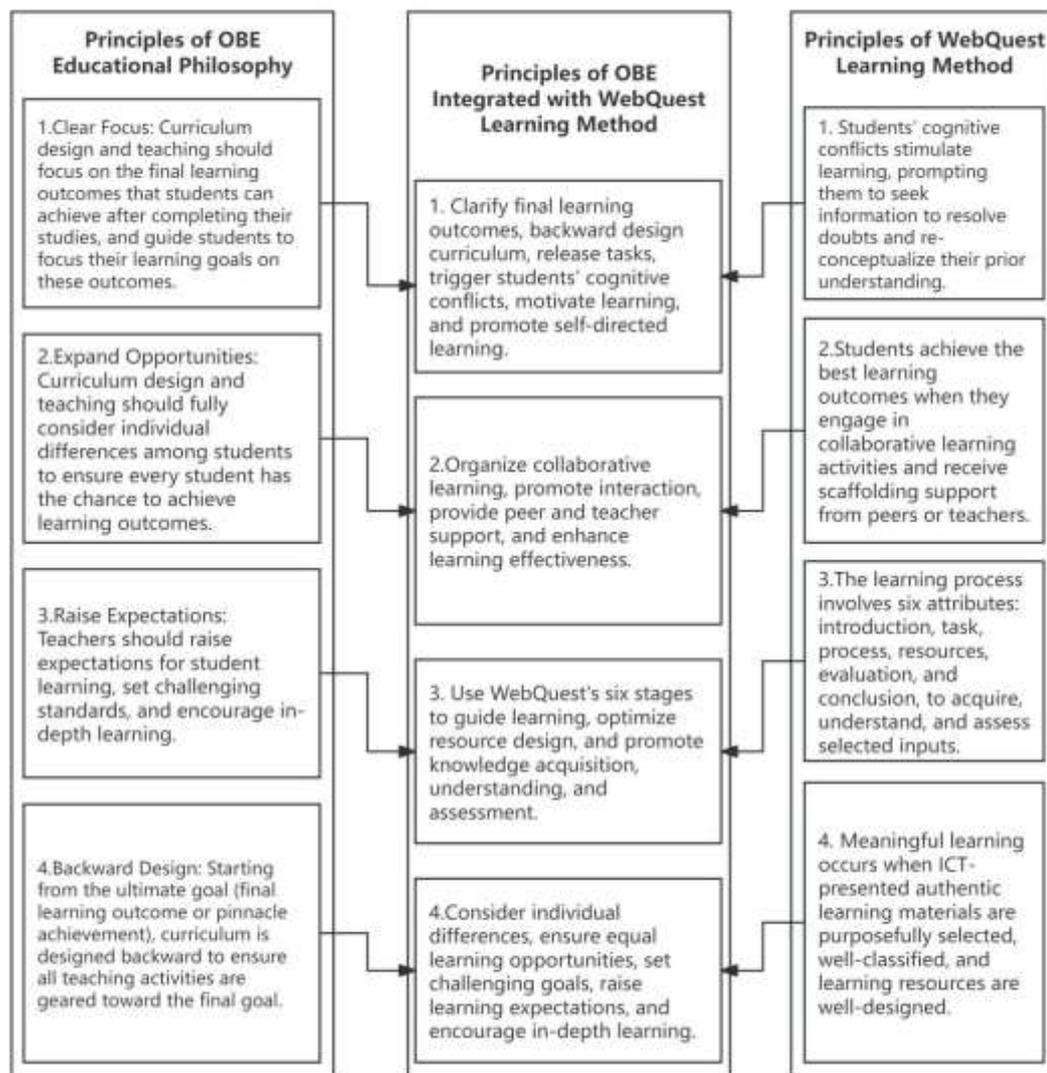


Figure 2.6 Principles of this study's model

The integrated model's core mechanism lies in reciprocal reinforcement:

OBE's "clear focus" and "backward design" provide a target for WebQuest's inquiry activities and BLM's resource integration, ensuring all elements serve predefined outcomes.

WebQuest's structured inquiry (via its six frameworks) enriches BLM's online-offline interactions, transforming passive content consumption into active knowledge

construction—directly enhancing the "skill enhancement" dimension of learning outcomes.

BLM's flexibility (online autonomy + offline guidance) supports OBE's "expanded opportunities" and "higher expectations," allowing students to engage with WebQuest tasks at their pace while receiving support to meet challenging standards.

This synergy addresses the limitations of single approaches: OBE prevents BLM from becoming aimless; WebQuest prevents BLM from reducing to mere technology use; BLM enables OBE to adapt to diversity and WebQuest to scale beyond classroom constraints. Together, they create a closed loop of "outcome definition → inquiry-based learning → multi-channel support → outcome evaluation → continuous improvement," maximizing learning effectiveness.

## Chapter 3

### Research Methodology

This study adopts a mixed research method, which is divided into three stages. In each stage, the research tools, sample selection, data collection, and analysis methods will be detailed one by one.

Phase 1: Corresponds to the completion of the first research objective of this study, which is to study the current status of the blended learning model among undergraduate students at Pingdingshan University.

Phase 2: Corresponds to the completion of the second research objective of this study, which is to develop a blended learning model for undergraduate student at Pingdingshan University.

Phase 3: Corresponds to the completion of the third research objective of this study, which is to evaluate the effectiveness of the developed blended learning model.

The details are as follows.

**Phase 1: To study the current status of the blended learning model among undergraduate students at Pingdingshan University.**

**The population / the sample Group**

The Population

Students: 1,598 undergraduate students at the School of Economics and Management, in Pingdingshan University.

Teachers: 75 teachers at the School of Economics and Management, in Pingdingshan University.

The Samples

Student Sample: 173 undergraduate students majoring in Management were selected using cluster random sampling. Specifically, there are 55 freshmen in one

class, 58 sophomores in another, and 60 juniors in the third class (seniors are not on campus due to internships).

Teacher Sample: Ten teachers involved in management - related teaching were interviewed.

### Research instrument

1. Student Questionnaire
2. Teacher Interviews
3. Statistical software

The research steps for the first stage are shown in Figure 3.1

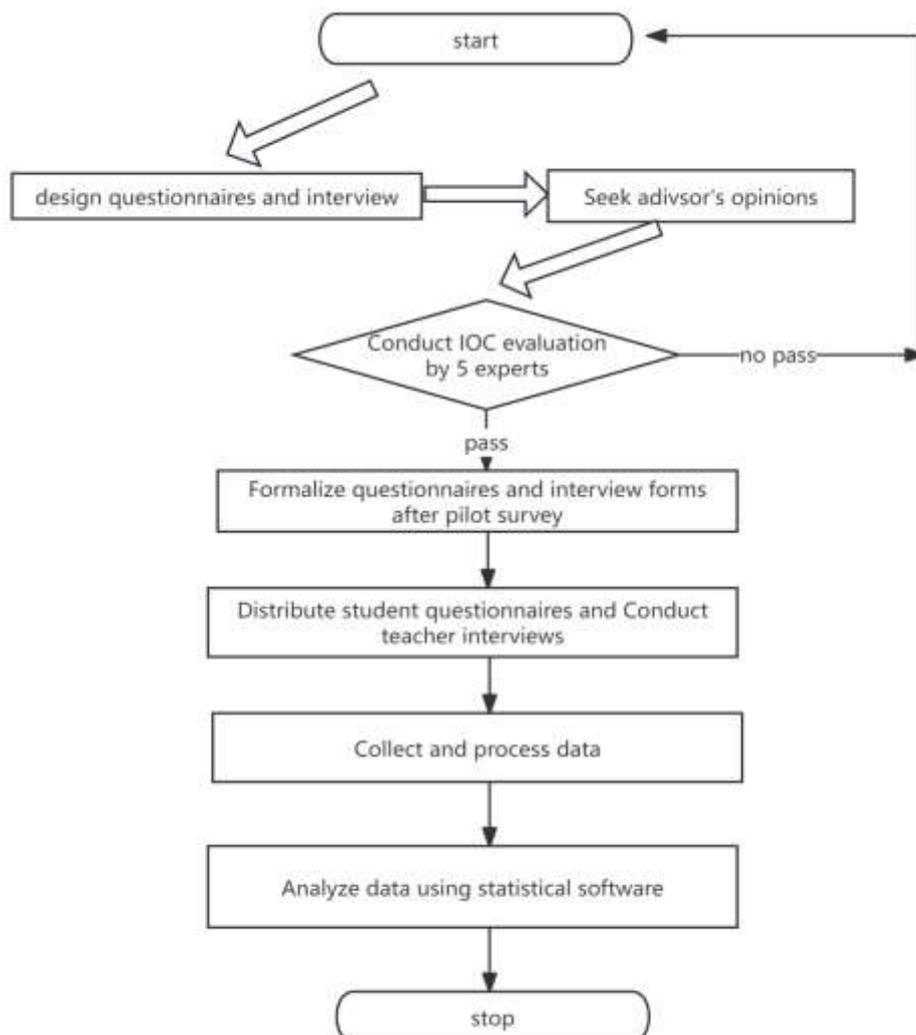


Figure 3.1 The steps of phase 1 process

### Research steps

- (1) Design a questionnaire on undergraduate blended learning and teacher interview forms.
- (2) Send the initial questionnaire and interview forms to five experts in education, management, etc., for their opinions.
- (3) Use the IOC and rating scales to collect and process expert opinions. If consistency is low, revise and resend; if high, finalize the content.
- (4) Conduct a pilot survey at PDS University and analyze the data. Revise questionnaire or interview forms if errors exist; otherwise, finalize them.
- (5) Organize the formal questionnaire and distribute it via Wen Juan Xing through WeChat and QQ to 173 undergraduate Management students.
- (6) Organize teacher interview forms, interview ten teachers, and collect answers.
- (7) Collect and process data.
- (8) Analyze data using statistical software.

### Designing instrument

#### Questionnaire:

1. Review literature related to undergraduate blended learning questionnaires.
2. Design a questionnaire on undergraduate blended learning.
3. Show the draft questionnaire to supervisors to check for accuracy and completeness.
4. Have five experts evaluate the questionnaire's validity using the Index of Coincidence (IOC) (Phongsi 2008, p.1951). The IOC assesses whether items measure their intended goals by having experts rate their relevance:
  - +1: Content is relevant to the topic
  - 0: Uncertain about relevance
  - -1: Content is irrelevant

The IOC for each item is calculated by summing expert ratings and dividing by the number of experts. Items with an IOC  $\geq 0.5$  are acceptable; others need revision or removal. This process enhances the questionnaire's validity and reliability.

5. Use a Likert scale for the questionnaire survey. This scale consists of a group of questions or statements related to a topic. The total score of items indicates respondents' attitudes or thoughts. A common form is a five-point scale. Design a Likert 5-point rating scale questionnaire based on the following criteria.

**Table 3.1** Five-Level Rating Scale for the Questionnaire

Description Range	Number
Strongly Disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly Agree	5

6. The specific content of the questionnaire is in Appendix C1.

#### **Teacher Interviews:**

(1) Develop an Interview Outline Based on Relevant Literature: Draft an interview outline and submit it to a consultant for review to ensure its correctness and completeness.

(2) Use the Index of Consistency (IOC): Have five experts evaluate the effectiveness of the teacher interviews using the Index of Consistency (IOC).

(3) Adjust and Finalize the Interview Outline: Based on the feedback from the five experts, make necessary adjustments and finalize the interview outline.

(4) Distribute the Interview Outline to a Sample Group: Send the finalized interview outline to a sample group of 10 teachers at PDS College's School of Economics and Management.

(5) Collect and Analyze Interview Data: Gather and analyze the data collected from the interviews.

The primary purpose of the interviews is to understand the current teaching methods, usage of teaching tools, awareness and attitudes towards blended learning models, as well as the problems and challenges faced by teachers at PDS College's School of Economics and Management. The interview questions can be categorized as follows:

Category 1: Current Teaching Methods

Question 1: What are the three most common teaching methods you use in your classroom instruction?

Question 2: During the teaching process, do you try new teaching methods? If yes, which new methods have you tried and what were their effects?

Category 2: Teaching Tools and Platforms

Question 3: What are the three most commonly used teaching tools or platforms in your teaching? Are you satisfied with the effectiveness of these tools or platforms?

Category 3: Awareness and Attitudes Towards WebQuest and MicroTeaching Platform

Question 4: Are you familiar with the WebQuest learning method and the MicroTeaching platform? If yes, what do you think are the advantages and disadvantages of these tools in teaching?

Category 4: Understanding and Prospects of Blended Learning Models

Question 5: What is your understanding of the blended learning model? In what ways do you see the potential applications of the blended learning model in teaching economics and management subjects?

Category 5: Challenges and Solutions for Implementing Blended Learning Models

Question 6: What challenges do you think might arise when implementing a blended learning model at PDS College's School of Economics and Management? How should these challenges be addressed?

### Statistical Software:

#### Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy

The statistical data analysis software tested the Kaiser-Meyer-Olkin (KMO) value, which is used to compare the magnitudes of simple correlation coefficients and partial correlation coefficients among variables. The KMO value ranges between 0 and 1. A KMO value closer to 1 indicates stronger correlations between variables, making the original variables more suitable for factor analysis. Conversely, if the KMO value is closer to 0, the sample data is less suitable for factor analysis.

#### Interpretation:

$KMO \geq 0.9$ : Marvelous

$0.8 \leq KMO < 0.9$ : Meritorious

$0.7 \leq KMO < 0.8$ : Middling

$0.6 \leq KMO < 0.7$ : Mediocre

$0.5 \leq KMO < 0.6$ : Miserable

$KMO < 0.5$ : Unacceptable

#### Bartlett's Test of Sphericity

Bartlett's Test of Sphericity is a statistical method used to determine whether there are correlations among variables. If the p-value from this test is less than the significance level (e.g., 0.05), the null hypothesis is rejected, indicating that there are significant correlations among the variables, and the data is suitable for factor analysis. Conversely, if the p-value is greater than the significance level, the null hypothesis cannot be rejected, suggesting that the variables are independent, and the data is not suitable for factor analysis.

#### Interpretation:

p-value < 0.05: Reject the null hypothesis; variables are correlated, and factor analysis is appropriate.

p-value  $\geq$  0.05: Fail to reject the null hypothesis; variables are independent, and factor analysis may not be appropriate.

### Combined Use of KMO and Bartlett's Test

Typically, the results of Bartlett's Test of Sphericity are used in conjunction with the KMO measure to provide a more comprehensive assessment of whether the data is suitable for factor analysis or other dimensionality reduction techniques. Both tests help ensure that the dataset is appropriate for factor analysis by confirming the presence of sufficient inter-variable correlations.

### Data Collection

(1) Distribute Questionnaires to the First Stage Sample Group: Distribute the questionnaires to 173 students in the first stage sample group to conduct the survey.

(2) Collect and Screen Questionnaires: Collect the distributed questionnaires, eliminate those that are not properly filled out, and organize the valid questionnaires.

(3) Conduct Interviews with 10 Teachers: Conduct interviews with 10 teachers in the sample group. During the interviews, the teachers' responses will be recorded on-site. After the interviews, the interview forms will be organized and submitted to the interviewees for review and confirmation. Once the interviewees' feedback is obtained, the interview forms will be collected to support subsequent data analysis.

### Data Analysis

Descriptive Statistical Analysis:

Calculate Means and Standard Deviations: Compute the mean and standard deviation for each item to understand the overall attitudes and usage of the blended learning model among students.

The formula for the mean is:  $\bar{x} = \frac{\sum_{i=1}^n x_i}{n}$

Where:

- $\bar{x}$  is the mean
- $x_i$  is the  $i$ th observation
- $n$  is the sample size

The formula for the standard deviation is:  $s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$

Where:

- $s$ : standard deviation
- $x_i$ : the  $i$ th observation
- $\bar{x}$ : mean
- $n$ : sample size

Calculate the frequency and percentage, i.e., the frequency distribution. By examining the number of people who chose each option, we can identify the preferences of respondents at different levels, making the research more targeted.

The formula for the frequency of the  $i$ th option or category is:  $f_i = \sum_{j=1}^n x_{ij}$

Where:

- $f_i$ : frequency of the  $i$ th option or category
- $x_{ij}$ : count of the  $i$ th option in the  $j$ th sample (1 if selected, 0 otherwise)
- $n$ : sample size

The percentage formula for the  $i$ th option or category is:  $p_i = \left(\frac{f_i}{n}\right) \times 100\%$

Where:

- $p_i$ : percentage of the  $i$ th option or category
- $f_i$ : frequency of the  $i$ th option or category
- $n$ : sample size

KMO (Kaiser-Meyer-Olkin) test:

The KMO (Kaiser-Meyer-Olkin) test is a statistical method to assess data suitability for factor analysis. It evaluates the strength of common factors among variables by comparing simple and partial correlation coefficients. A KMO value closer to 1 means weaker partial correlations and better suitability for factor analysis.

Calculation formula:

$$KMO = \frac{\sum_{i \neq j} r_{ij}^2}{\sum_{i \neq j} r_{ij}^2 + \sum_{i \neq j} u_{ij}^2}$$

KMO value:

- KMO > 0.9: Very suitable for factor analysis;
- $0.8 \leq KMO \leq 0.9$ : Suitable for factor analysis;
- $0.7 \leq KMO < 0.8$ : Mediocre;
- KMO < 0.7: Not suitable for factor analysis.

Bartlett's Sphericity Test:

Bartlett's Sphericity Test is a statistical method testing whether data meet the sphericity assumption, checking for high inter - correlations among variables. It is commonly used in Principal Component Analysis (PCA) and Factor Analysis (FA) to assess variable correlations.

Calculation formula:

The formula for the chi - square statistic is:  $\chi^2 = (n - 1 - \frac{2p+5}{6}) \ln |\mathbf{R}|$

Where:

- $\chi^2$ : chi - square statistic
- $n$ : sample size
- $p$ : number of variables
- $\mathbf{R}$ : correlation matrix

Data from interviews is used to sum each teacher's scores per item, calculating means and standard deviations to gauge overall teacher attitudes. Additionally, teaching design and methods for achieving learning objectives are analyzed to inform the development of blended learning models.

### Expected Output of Phase 1

The current status of blended learning among undergraduate students in the School of Economics and Management at PDS University can inform the development of future blended learning models.

### Phase 2: To develop a blended learning model for undergraduate student at Pingdingshan University.

The research steps for the second stage are shown in Figure 3.2

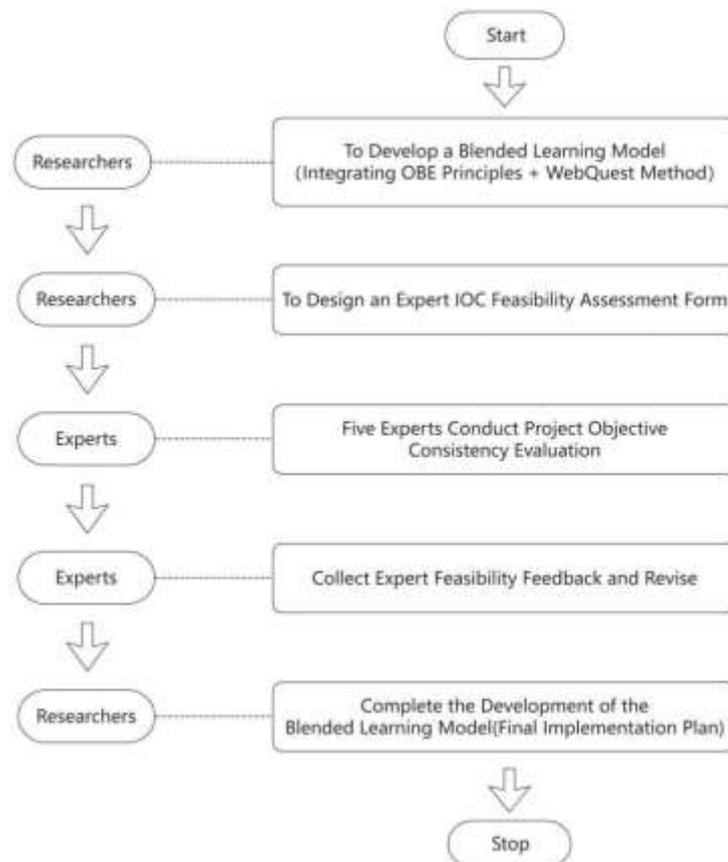


Figure 3.2 The steps of phase 2 process

### Research Steps

(1) Based on the first - stage results and relevant literature, this study developed an inquiry - collaborative blended learning model integrating OBE and WebQuest for undergraduates at PDS University's School of Economics and Management.

(2) Designed a goal - consistency assessment form for the blended learning model.

(3) Invited five experts to conduct an item - objective - consistency test on the questionnaire.

(4) Collected and analyzed expert opinions, and revised the learning model accordingly.

(5) Finally, developed the blended learning model for this study.

The development process of the blended learning model is shown in the figure 3.3 below:

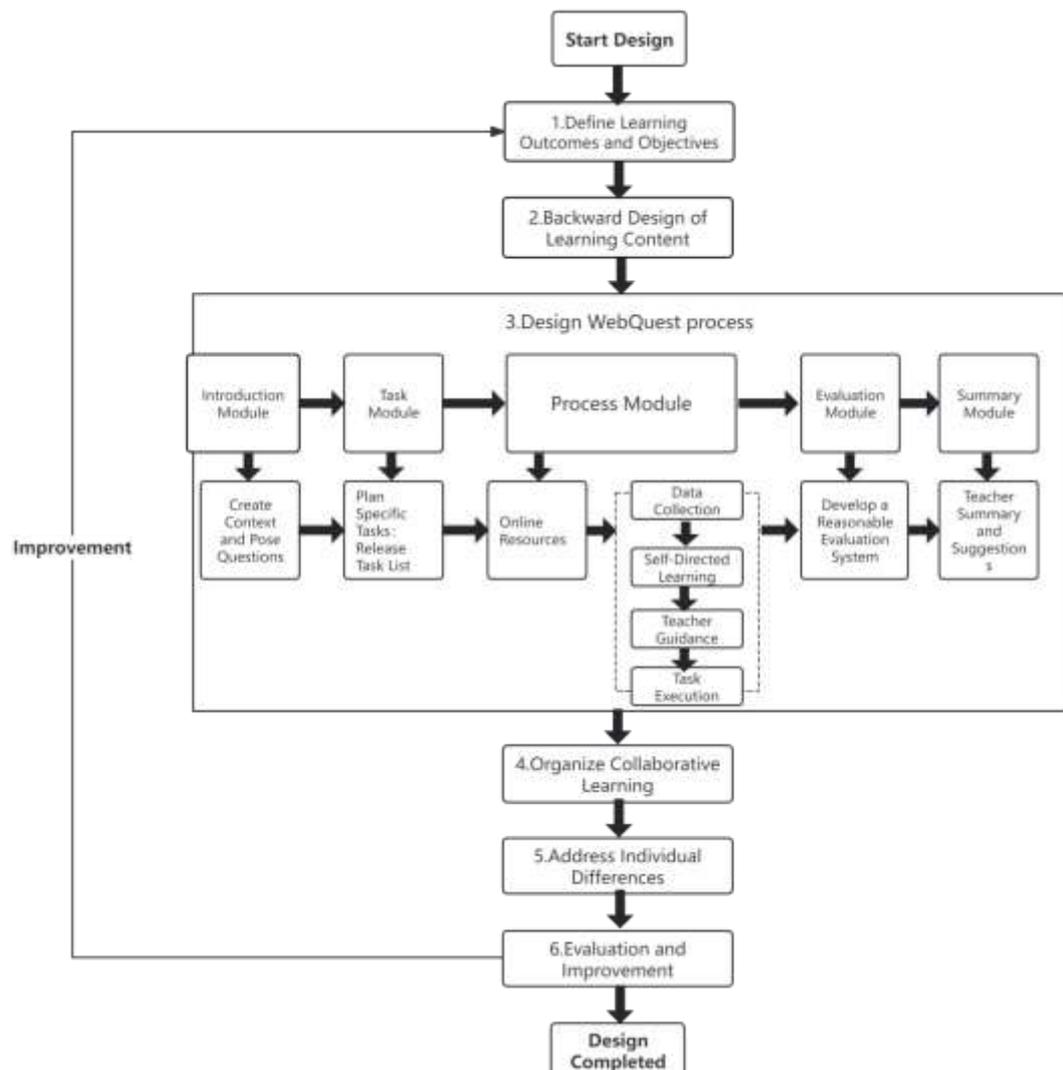


Figure 3.3 The development process of the BLM (1.0)

### **Define Learning Outcomes and Objectives**

Step Description: Based on OBE, clarify the final learning outcomes students should achieve after completing the blended learning model.

Specific Actions:

Identify the course's core learning objectives (e.g., knowledge mastery, skill enhancement).

Develop quantifiable assessment criteria to ensure the measurability of learning outcomes.

Publish course objectives and learning outcomes on the Micro - Teacher Assistant platform for students to access anytime.

### **Backward Course Design**

Step Description: Design course content and teaching activities backward from the final learning outcomes.

Specific Actions:

Design a course syllabus, specifying learning objectives and assessment methods for each module.

Develop a detailed teaching plan to ensure each activity aligns with the final learning outcomes.

### **Design WebQuest Tasks**

Step Description: Design challenging learning tasks based on WebQuest's six components.

Specific Actions:

Introduction: Release scenarios or questions on the Micro - Teacher Assistant platform to engage students.

Task: Assign specific tasks via the platform's homework function, ensuring they match learning objectives.

Process: Provide detailed steps and guidance on the platform to help students complete tasks.

Resources: Use the platform's resource - distribution function to select and organize learning resources carefully.

Evaluation: Design diverse assessment methods and conduct self - evaluation, peer evaluation, and teacher evaluation through the platform's interactive functions.

Conclusion: Release a summary task on the platform to guide students' reflection on their learning process.

### **Organize Collaborative Learning**

Step Description: Promote student collaboration and improve learning effectiveness through group activities.

Specific Actions:

Use the platform's interactive functions to design group tasks and encourage collaborative problem - solving.

Create daily quick - answer question banks on the platform to enhance learning effectiveness.

Teachers participate in discussions regularly and provide feedback and guidance via the platform.

### **Consider Individual Differences**

Step Description: Design flexible learning paths to ensure every student can achieve learning outcomes.

Specific Actions:

Use the platform's resource - distribution function to provide diverse learning resources for different styles and needs.

Design personalized learning tasks via the platform's homework function, allowing students to choose based on their interests and abilities.

Use the platform's daily quick - answer function to boost participation and help students check their knowledge mastery.

### **Assessment and Improvement**

Step Description: Evaluate the blended learning model's effectiveness through diverse assessment methods and make improvements based on the results.

#### Specific Actions:

Develop a comprehensive assessment plan and conduct formative and summative assessments using the platform's homework and interactive functions.

Collect and analyze student learning data to assess the achievement of learning outcomes.

Adjust the course design and teaching activities according to the assessment results to optimize the blended learning model.

#### **The Population**

There are 173 undergraduate students majoring in Management at the School of Economics and Management, PDSU. Specifically, there are 55 freshmen in one class, 58 sophomores in another, and 60 juniors in the third class (seniors are not on campus due to internships).

#### **The Sample Group**

Using cluster random sampling, 60 junior Management students were selected as the sample. These 60 students from the junior class were divided into two groups: Group A (experimental, 30 students using blended learning) and Group B (control, 30 students using traditional learning).

Experimental Group: Class 1, junior 3, Management Major, Group A (30 students)

Control Group: Class 1, junior 3, Management Major, Group B (30 students)

#### **Research Instrument**

Goal - Consistency Assessment Form for Blended Learning Model

IOC form-By using the Item Objective Congruence (IOC), experts can score the model.

#### **Designing Instrument**

(1) Design the process of blended learning model.

(2) Develop a goal - consistency assessment form to evaluate the model's feasibility.

(3) Conduct an Item - Objective - Consistency (IOC) test with five experts to assess the model's validity.

Rating Criteria:

+1: Complete consistency, design matches objectives.

0: Uncertain, design partially matches or needs modification.

-1: Inconsistent, design does not match objectives.

Judging Criteria:

IOC  $\geq$  0.5: High consistency, model is feasible.

IOC  $<$  0.5: Low consistency, modifications needed.

Acceptable IOC should be no less than 0.5 to ensure relevance and coherence between the questionnaire and research objectives.

#### **Data Collection**

(1) Collect expert ratings: Record and compile each expert's scores on the objectives and content of the blended learning model into a data table.

(2) Gather expert feedback: Collect specific feedback and suggestions from experts for analysis and improvement.

#### **Data Analysis**

Calculate IOC values for each assessment item using expert ratings. If all items have IOC  $\geq$  0.5, the model is highly consistent with objectives and feasible. If any item has IOC  $<$  0.5, modifications or optimizations are needed.

#### **Expected Output Phase 2**

Complete the development of the blended learning model.

### **Phase 3: To evaluate the effectiveness of the developed blended learning model.**

In stage three of this study, the developed blended learning model's effectiveness in "Personnel Quality Assessment" will be evaluated experimentally to determine its efficacy in enhancing college students' autonomous learning.

#### **The population/the sample Group**

The Population

There are 173 undergraduate students majoring in Management at the School of Economics and Management, PDSU. Specifically, there are 55 freshmen in

one class, 58 sophomores in another, and 60 juniors in the third class (seniors are not on campus due to internships).

#### The Sample Group

Using cluster random sampling, 60 junior Management students were selected as the sample. These 60 students from the junior class were divided into two groups: Group A (experimental, 30 students using blended learning) and Group B (control, 30 students using traditional learning).

Experimental Group: Class 1, junior 3, Management Major, Group A (30 students)

Control Group: Class 1, junior 3, Management Major, Group B (30 students)

The research steps for the third stage are shown in Figure 3.4

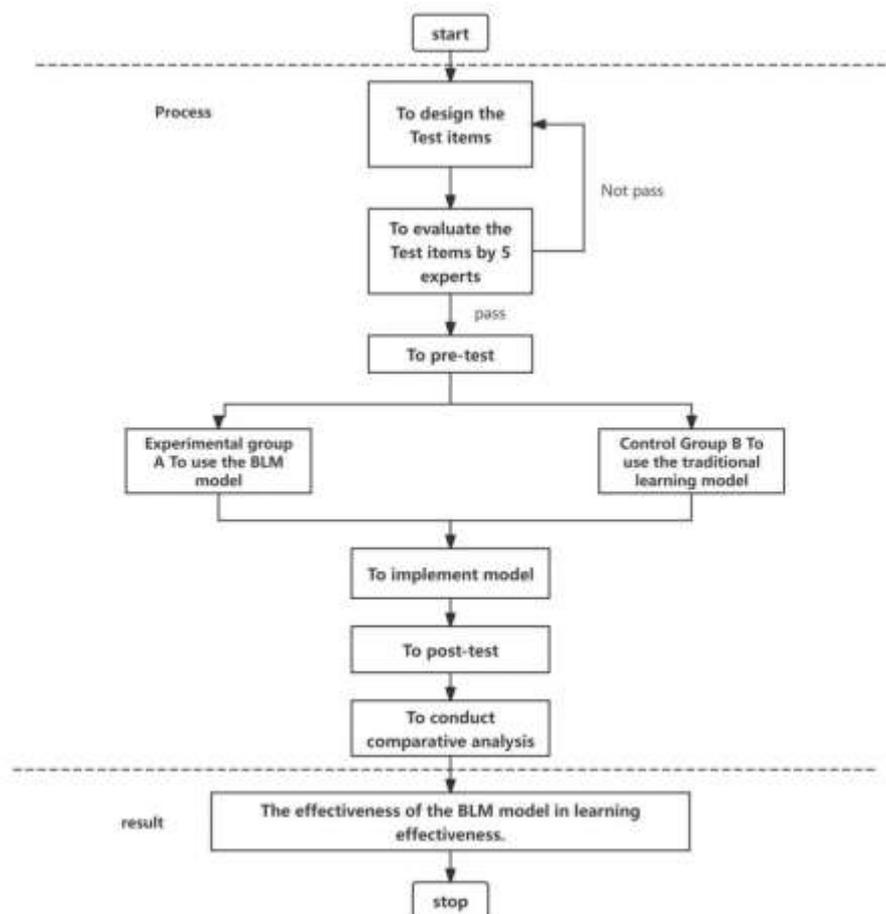


Figure 3.4 The steps of phase 3 process

### **Research Steps**

(1) Develop test questions for pre - and post - tests based on the learning content.

(2) Have five experts evaluate the relevance of each question to the construct. Calculate the IOC value for each question based on expert feedback. Revise or eliminate questions with IOC values below the standard to improve the test's validity.

(3) After revising the test, create a test question bank.

(4) Before implementing the blended learning model, conduct a pre - test for both the experimental group (30 students) and the control group (30 students) using the same set of test questions. Record their pre - test scores.

(5) Implement the blended learning model for the experimental group (30 students from Class 1, Junior Year) and use the traditional learning method for the control group (30 students from Class 1, Junior Year).

(6) After the blended learning implementation, conduct a post - test for both groups using the same test questions. Record their post - test scores.

(7) Compare the post - test results with the pre - test results, analyze the data, and draw conclusions.

(8) Summarize, organize, reflect on, and revise the research findings.

### **Research Instruments**

#### **Group A and Group B:**

Group A uses the blended learning model.

Group B does not use the blended learning model.

#### **Pre-test and Post-test:**

Conduct pre-tests and post-tests using the same set of questions to measure learning outcomes before and after the intervention.

## Designing Instruments

### Implementation of Teaching Models

(1) Design Learning Plans for Both Groups: Based on the research objectives of the third phase, design learning plans for both sample groups (A and B).

### Pre-test and Post-test Design

#### Create Test Content Based on Learning Materials

Develop test questions based on the implemented learning content. Ensure that the test questions cover key knowledge points and are of moderate difficulty to accurately reflect learning outcomes in the post-test. For this study, a set of 20 multiple-choice questions, each worth 5 points for a total of 100 points, has been created. These questions focus on the operational procedures of "Personnel Quality Assessment," including core concepts in plan formulation, activity implementation, feedback, and evaluation. These questions will help assess students' understanding and mastery of the course content and ensure that the post-test accurately reflects learning outcomes.

(2) Conduct Pilot Testing with Non-Sample Students: Have 113 undergraduate students from PDS College's School of Economics and Management (excluding the 60 students in the sample groups) take the pilot test to evaluate the difficulty and effectiveness of all test questions.

(3) Evaluate Test Questions Using IOC: Have five experts evaluate the effectiveness of the designed pre-tests and post-tests using the Index of Consistency (IOC). The scoring criteria are as follows:

1 = Confident that the question is relevant to the objective

0 = Uncertain whether the question is relevant to the objective

-1 = Confident that the question is not relevant to the objective

Acceptable items must have an IOC value of at least 0.5. The IOC values are calculated through validation measures to assess the relevance and coherence of the scoring criteria.

(4) Establish a Test Question Bank After Modifications: After testing and assessment, revise the test questions as needed and establish a comprehensive test question bank.

#### Data Collection

(1) Before the blended learning model was implemented, both the sample group (30 students) and the control group (30 students) took a pre-test using the same set of questions. Their pre-test scores were recorded and organized to obtain the pre-test data.

(2) After the blended learning model was implemented, a post-test was conducted using the same set of test questions for both groups. Their post-test scores were recorded and organized to obtain the post-test data.

#### Data Analysis

(1) The pre-test and post-test scores of both classes were analyzed for mean and standard deviation, and the data was visualized (e.g., bar charts or box plots). Descriptive statistics were used to preliminarily evaluate the implementation effect of the blended learning model.

(2) An independent samples t-test was performed on the pre-test and post-test scores of both classes to analyze the differences in learning outcomes. The conclusions drawn from the results were used to determine whether the blended learning model significantly improved autonomous learning.

(3) The effect size  $d$  was calculated to measure the testing effect, with the following interpretations:

$$d = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{n_1 + n_2 - 2}}}$$

Where:

- $\bar{X}_1$  and  $\bar{X}_2$  are the means of the two groups of data.
- $S_1^2$  and  $S_2^2$  are the variances of the two groups of data.
- $n_1$  and  $n_2$  are the sample sizes of the two groups of data.

$d = 0.2$  indicates a small effect

$d = 0.5$  indicates a medium effect

$d = 0.8$  indicates a large effect

### **Expected Output Phase 3**

The rationality and scientificity of the blended learning model.

# Chapter 4

## Results of Analysis

This research was to study explore and develop a blended learning model suitable for undergraduate students majoring in Management at Pingdingshan University. The objectives of this study are as follows: 1. To study the current status of the blended learning model among undergraduate students majoring in Management at Pingdingshan University. 2. To develop a blended learning model for undergraduate students majoring in Management at Pingdingshan University. 3. To evaluate the effectiveness of the blended learning model. This chapter describes and analyzes the research results in detail. The data analysis result can be presented as follows:

1. Symbol and abbreviations
2. Presentation of data analysis
3. Results of data analysis

The details are as follows.

### **Presentation of Data Analysis**

This study primarily adopts a combination of quantitative and qualitative research methods for data analysis, including questionnaire surveys, interviews, and experimental methods. The research consists of the following three main parts:

Part 1: Analysis results serving Objective 1 - To study the current status of the blended learning model among undergraduate students at Pingdingshan University.

Part 2: Analysis results serving Objective 2 - To develop a blended learning model for undergraduate students at Pingdingshan University.

Part 3: Analysis results serving Objective 3 - To evaluate the effectiveness of the blended learning model.

## Results of Data Analysis

The analysis findings are geared toward Objective 1: investigating the current state of blended learning models among undergraduate students at Pingdingshan University.

This section presents the analytical results for Objective 1 through descriptive statistics, including tables, charts, mean values, standard deviations, and significance levels. Subsequently, item-specific data for all factors will be showcased in the same format.

**Part 1: Analysis results serving Objective 1 - To study the current status of the blended learning model among undergraduate students at Pingdingshan University.**

### **Analysis of student questionnaire data**

#### Demographic information

For this phase of the research, a questionnaire survey was employed, utilizing the "Questionnaire on the Current Status and Learning Outcomes of Undergraduate Blended Learning Models" (for details, see Appendix C1). Paper questionnaires were distributed to current undergraduate students majoring in Management at Pingdingshan University, with a total of 173 copies issued. After screening the returned questionnaires—excluding those with missing answers or incomplete responses—a final count of 173 valid questionnaires was confirmed.

This questionnaire, designed for undergraduates at Pingdingshan University, includes several sections. The basic information segment covers details such as junior, major, gender, devices used for online learning, daily duration of electronic device usage, purposes of device use for learning, network environment, and the number of days spent on self-directed learning per week. The second section, using a 1-5 rating scale, explores the current state of blended learning by examining students' utilization of blended learning resources, participation in related activities, satisfaction levels, interaction frequency, and knowledge acquisition. The third section, also employing a 1-5 scale, delves into key factors influencing learning

outcomes from three dimensions: individual student factors, learning behavior factors, and learning environment and resources. All data is solely for academic research purposes, with anonymity strictly maintained. Table 4.1 illustrates the distribution of demographic variables among respondents, providing an overview of the basic characteristics of the research sample.

**Table 4.1** Usage of Online Learning Devices

Category (Percentage)	junior Level	%	Gender	%
Item	Freshman	31.8%	Male	25.4%
	Sophomore	33.5%	Female	74.6%
	Junior	34.7%		

This study conducts analysis based on 173 valid respondents, with complete and non-missing data. A descriptive statistical analysis was performed on the demographic characteristics of these 173 respondents, and the results are as follows:

junior distribution: The respondents cover all three undergraduate juniors. Among them, there are 55 freshmen, accounting for 31.8% of the total sample; 58 sophomores, making up 33.5%; and 60 juniors, representing 34.7%. The mean junior value is 2.03 (coded as 1 = freshman, 2 = sophomore, 3 = junior), with a minimum of 1, a maximum of 3, and a range of 2. The overall distribution shows a balanced feature of upper-middle juniors.

Major composition: All respondents are from the Management major, totaling 173 people, accounting for 100.0%, indicating a highly consistent professional background.

Gender ratio: There are 44 male respondents, accounting for 25.4%, and 129 female respondents, accounting for 74.6%. The mean gender value is 1.75 (coded as 1 = male, 2 = female), with a minimum of 1, a maximum of 2, and a range of 1, showing that the female group is dominant.

The data fully presents the distribution characteristics of the respondents' juniors, majors, and genders, providing a clear demographic background support for the subsequent analysis of the blended learning model.

**Questions 4 to 7 focus on students' online learning devices, usage duration, purposes of use, and network environment:**

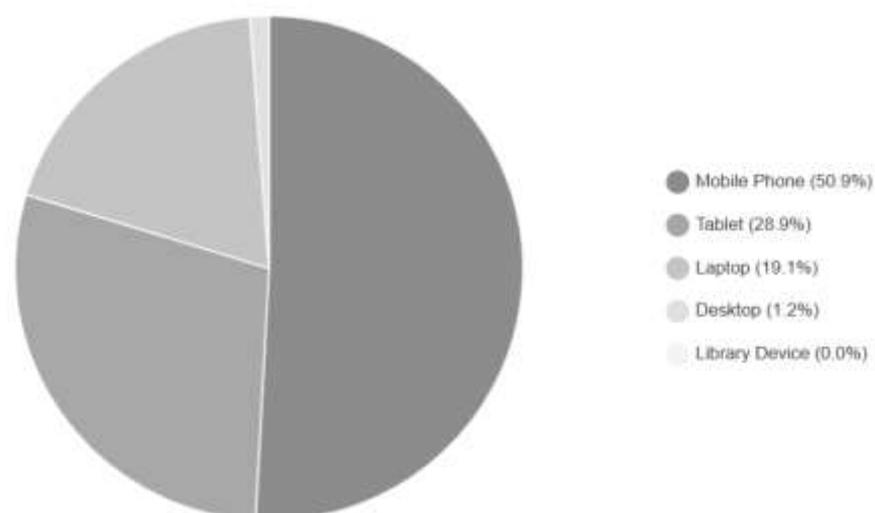
(1) Online learning devices: Five options such as mobile phones, tablets, and laptops are provided to understand the commonly used learning terminals by students.

(2) Duration of electronic device usage: It is divided into four intervals: 5 minutes, 30 minutes, 1 hour, and more than 2 hours, so as to grasp the daily time investment of students in using electronic devices.

(3) Purposes of online learning: It covers options like watching course videos and completing after-class assignments, reflecting the main activity directions of students' online learning.

(4) Network environment: It includes options such as campus network and home broadband, clarifying the network conditions for students to participate in blended learning.

Survey on Blended Learning Status of Undergraduate Students at Pingdingshan University (n=173)

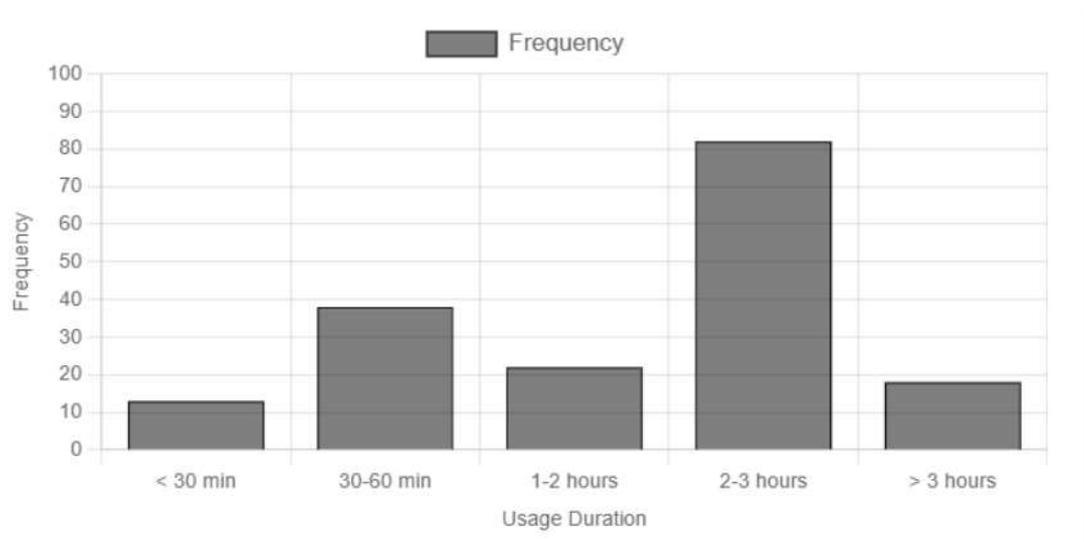


**Figure 4.1** Usage of Online Learning Devices

**Table 4.2** Distribution of Usage Frequency for Online Learning Devices

Device Type	Frequency	Percentage
Mobile Phone	88	50.9%
Tablets	50	28.9%
Laptop	33	19.1%
Desktops & Others	2	1.2%

Learning devices: Over half (50.9%) of the students choose to use mobile phones for online learning, with tablets and laptops accounting for 28.9% and 19.1% respectively. Desktop computers and library electronic devices are less frequently used, selected by only 1.2% of the students. It is evident that mobile phones and tablets, due to their portability, have become the primary tools for online learning.

**Figure 4.2** Daily Hours Spent on Electronic Devices

Daily Hours Spent on Electronic Devices:

- 1 – Less than 2 h: 13 (7.5%)
- 2 – 2–4 h: 38 (22.0%)
- 3 – 4–6 h: 22 (12.7%)
- 4 – 6–8 h: 82 (47.4%)
- 5 – More than 8 h: 18 (10.4%)

Usage duration: Nearly half (47.4%) of the students spend more than 2 hours daily using electronic devices, 22.0% use them for 30 minutes, 12.7% for 1 hour, and 7.5% for 5 minutes. Additionally, 10.4% of the students report longer usage times. This indicates that most students invest a considerable amount of time in electronic devices, whether for learning or other activities.



**Figure 4.3** Daily Hours Spent on Electronic Devices

Self-Scheduled Blended Learning Days per Week:

1 day: 37 students (21.4%)

2 days: 40 students (23.1%)

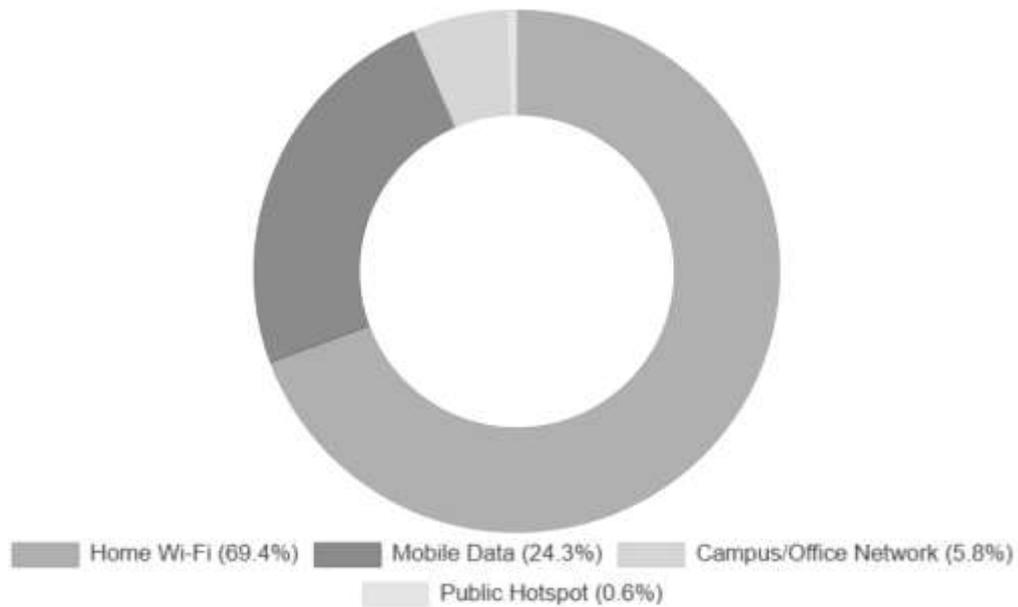
3 days: 28 students (16.2%)

4 days: 49 students (28.3%)

5 days: 19 students (11.0%)

Arrangement of study days: Regarding the number of days students independently arrange for blended learning each week, 28.3% of the students choose 4 days, 23.1% choose 2-3 days, 21.4% choose 1 day, and 16.2% choose 5

days. This indicates that students' scheduling of blended learning time is relatively scattered, and the regularity needs to be strengthened.



**Figure 4.4** Daily Hours Spent on Electronic Devices

Network Environment:

- 1 – Home Wi-Fi: 120 students (69.4%)
- 2 – Mobile Data: 42 students (24.3%)
- 3 – Campus/Office Network: 10 students (5.8%)
- 4 – Public Hotspot: 1 student (0.6%)

Network environment: 69.4% of students primarily use the campus network for online learning, 24.3% rely on home broadband, 5.8% use mobile hotspots, and only 0.6% utilize public WiFi. This indicates that the campus network serves as the most dominant network support for students' participation in blended learning.

## To Analysis the Current Situation of Blended Learning Among College Students

### Reliability and Validity Analysis

Before conducting questionnaire data analysis, it is necessary to verify whether the quality of the collected data meets the standard ranges for various tests. Reliability and validity tests are two essential indicators for evaluating data quality. The SPSS statistical analysis software was used to perform reliability testing.

Reliability refers to the consistency of multiple measurement indicators for the same issue. In this study, SPSS 26 was employed to measure such consistency, primarily using Cronbach's  $\alpha$  coefficient. The Cronbach's  $\alpha$  coefficient assesses the degree of correlation between different items measuring the same construct; generally, a coefficient greater than 0.7 indicates high reliability of the scale. As a prerequisite for validity testing, reliability testing must be conducted first.

Using SPSS 26.0, the reliability of each dimension of the data scale collected by the questionnaire in this study, as well as the overall reliability, were calculated. The reliability results for each dimension are summarized in Table 4.3. As shown in Table 4.3, in the reliability analysis, the Cronbach's  $\alpha$  coefficient for all constructs in this study was 0.854, which is above 0.8, and the reliability results for each dimension also exceeded 0.8. These findings indicate that the data have passed the Cronbach's  $\alpha$  reliability test, demonstrating good stability and credibility of the questionnaire results.

**Table 4.3** Reliability Statistics

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
.854	.854	19

**Table 4.4** Reliability Analysis by Dimension

Dimension	Option	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
Current Status of Blended Learning	1. Will utilize various resources in blended learning to assist my learning (such as online courses, test questions, etc.)	.508	.845
	2. Frequently participate in online learning activities (such as watching videos, taking online tests, etc.)	.451	.847
	3. Have a high overall satisfaction with the current blended learning mode	.570	.841
	4. In blended learning, have a high frequency of interaction with teachers and classmates	.488	.845
	5. Blended learning helps better master the course knowledge	.427	.848
Influencing Factors of	6. Have clear learning goals and strong learning motivation	.508	.845
Learning Effect	7. Hold a positive attitude towards blended learning and willing to participate proactively	.451	.847
	8. Can independently arrange online learning time	.570	.841
	9. Can effectively integrate online resources with offline classroom content for review	.488	.845

Table 4.4 (Continued)

Dimension	Option	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
	10. Actively participate in discussions and interactions in online or offline classes	.427	.848
	11. Regularly summarize and reflect on what have learned, and adjust my learning methods	.201	.857
	12. Can complete the online/offline assignments or tasks assigned by teachers on time	.504	.845
	13. When encountering learning difficulties, will proactively seek solutions (such as consulting materials, asking others for advice, etc.)	.523	.844
	14. Invest sufficient independent learning time every week in learning content related to blended learning	.526	.844
	15. Immediate feedback in learning (such as in-class quiz answers, question explanations, etc.) helps me better understand knowledge points	.434	.848
	16. The operation guidelines for the online learning platform are clear and easy to understand (such as login, homework submission processes, etc.)	.363	.850

Table 4.4 (Continued)

Dimension	Option	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
	17. The teaching materials, reference books, etc. provided in blended learning are abundant and practical	.406	.849
	18. The online learning platform is easy to operate and can well support learning	.408	.849
	19. Can conveniently access learning resources such as teaching materials, exercises, reference books, etc.	.397	.849

This study used SPSS 26.0 statistical analysis software to test the Kaiser-Meyer-Olkin (KMO) value. The KMO value is used to compare variables between simple correlation coefficients and partial correlation coefficients, with a range of 0 to 1. The closer the KMO value is to 1, the stronger the correlation between variables, and the more suitable the original variables are for factor analysis; conversely, the sample data is not suitable for factor analysis. As shown in Table 4.4, the KMO value of the data in this study is 0.851, indicating a strong correlation between variables, which is much higher than the recommended value of 0.5. Therefore, the data is suitable for principal component analysis and can be further subjected to validity testing.

**Table 4.5** Reliability Analysis by Dimension

<b>KMO Measure of Sampling Adequacy</b>			0.851
		Approx. Chi-Square	781.971
Questionnaire	Bartlett's Test of Sphericity	df	171
		Sig.	.000

### **Data Analysis on the Current Status of Blended Learning**

Based on 173 valid data samples, this section adopts a questionnaire survey method to conduct a quantitative analysis of the current status of blended learning among undergraduate students. A Likert 5-point scale is employed to assess students' performance in five dimensions, namely resource utilization, activity participation, model satisfaction, interaction frequency, and knowledge acquisition effect. Descriptive statistical analysis is then carried out to reveal students' perceptions and experiences of the blended learning model, analyze existing problems, and provide a scientific basis for optimizing the blended learning model and improving teaching quality.

#### **Overall Characteristics**

In terms of mean values, the mean values of Items 8 to 12 range from 3.49 to 3.61, generally falling in the transition zone between "Neutral" and "Agree" on the Likert scale. This indicates that although students have a certain degree of recognition for the current blended learning model, such recognition has not reached a high level, and there is still significant room for improvement.

The standard deviation of each item fluctuates between 0.661 and 0.883, which suggests that there are individual differences in students' evaluations across various dimensions—some students show obvious discrepancies in their experiences and perceptions of blended learning.

Table 4.6 8-12 Items of values

Items	Number of Valid Cases	Mean	Median	Standard Deviation	Variance	Score 1	Score 2	Score 3	Score 4	Score 5
						(Number/Percentage)	(Number/Percentage)	(Number/Percentage)	(Number/Percentage)	(Number/Percentage)
8. Use various resources in blended learning to support my study	173	3.49	3.00	0.744	0.554	0/0%	8/4.6%	91/52.6%	56/32.4%	18/10.4%
9. Frequently participate in online learning activities	173	3.51	3.00	0.661	0.437	0/0%	3/1.7%	92/53.2%	65/37.6%	13/7.5%
10. Have a relatively high overall satisfaction with the current blended learning model	173	3.59	3.00	0.799	0.639	0/0%	8/4.6%	81/46.8%	58/33.5%	26/15.0%
11. In blended learning, have a relatively high frequency of interaction with teachers and classmates	173	3.51	3.00	0.833	0.693	0/0%	16/9.2%	74/42.8%	61/35.3%	22/12.7%
12. Blended learning helps better master course knowledge	173	3.61	4.00	0.670	0.449	0/0%	1/0.6%	83/48.0%	72/41.6%	17/9.8%

From Table 4.6

### **Analysis of Specific Dimensions**

#### **Utilization of Blended Learning Resources**

For the item "I use various resources in blended learning to support my study", the mean score is 3.49, which falls at the "Neutral" level. From the perspective of frequency distribution, 52.6% of students chose "Neutral (Score 3)", while only 10.4% chose "Strongly Agree (Score 5)". This reflects that over half of the students are relatively passive in utilizing blended learning resources, lacking enthusiasm for proactively exploring and fully using resources such as online courses and test questions. As a result, resources have not been effectively developed and utilized. Potential issues may include insufficient attractiveness of resources, inconvenient access to resources for students, or inadequate awareness of the value of resources.

#### **Participation in Online Learning Activities**

This item has a mean score of 3.51, also close to the "Neutral" level. Among the respondents, 53.2% chose "Neutral", and 7.5% chose "Strongly Agree". This indicates that although most students participate in online learning activities, they lack depth and initiative in their participation. Online learning activities may be unattractive in terms of form, content, or organizational methods, failing to fully stimulate students' enthusiasm for participation. Consequently, students only engage in superficial participation, making it difficult to achieve the goal of in-depth learning.

#### **Satisfaction with the Blended Learning Model**

The mean score of students' overall satisfaction with the current blended learning model is 3.59. Among them, 46.8% of students hold a "Neutral" attitude, and 15.0% chose "Strongly Agree". This shows that the existing blended learning model fails to fully align with students' needs in aspects such as teaching process design, resource allocation, and the application of teaching methods, and has not reached the ideal state expected by students. Urgent improvements are needed in optimizing teaching links and providing personalized learning support to enhance students' satisfaction.

### **Frequency of Interaction with Teachers and Classmates**

For the item "In blended learning, I have a relatively high frequency of interaction with teachers and classmates", the mean score is 3.51. 42.8% of students chose "Neutral", and 9.2% chose "Disagree (Score 2)". The data reveals obvious deficiencies in the interaction links of blended learning-communication and interaction between teachers and students, as well as among students, have not achieved the ideal effect in terms of frequency, depth, and breadth. Possible reasons include incomplete functions of the interaction platform, lack of interest and pertinence in interaction methods, or insufficient effective interaction guidance and incentive mechanisms, which lead to low enthusiasm among students to participate in interactions.

### **Effect of Mastering Course Knowledge**

The item "Blended learning helps me better master course knowledge" has a mean score of 3.61, the highest among the 5 items in this section. However, 48.0% of students still chose "Neutral". This indicates that blended learning has a certain positive effect on knowledge delivery and students' knowledge mastery, but it has not yet formed a significant advantage. During the teaching process, there may be problems such as insufficiently thorough explanation of knowledge, delayed learning feedback, and weak links in knowledge consolidation and application, which affect students' in-depth understanding and effective mastery of course knowledge.

Undergraduate students have a moderate overall acceptance level of the blended learning model, with obvious shortcomings in several key links such as resource utilization, activity participation, and interaction frequency. Students show insufficient initiative and in-depth participation in the blended learning process, and the existing model still has significant room for improvement in meeting students' learning needs and enhancing the learning experience

### **Part Three: Factors Influencing Learning Outcomes**

Learning outcomes are influenced by the interaction of multiple factors. An in-depth analysis of influencing factors across various dimensions is of crucial significance for optimizing the blended learning model and improving teaching quality. Based on data from 173 valid questionnaires, this part conducts a systematic analysis from three core dimensions: student individual factors, learning behavior factors, and learning environment & resources. Student individual factors include learning goals and motivation, learning attitudes, etc., which directly affect students' learning initiative.

Learning behavior factors cover classroom participation, assignment completion, and other aspects, reflecting students' actual performance during the learning process.

Learning environment & resources refer to external support conditions such as platform operation and resource access.

Through quantitative interpretation of item data across all dimensions, this part identifies the key factors affecting students' learning outcomes in current blended learning, thereby providing a scientific basis for subsequent teaching improvements and model optimization.

#### **Student Individual Factors**

This section is based on data from Items 13 to 16 of the 173 valid questionnaires. It focuses on student individual factors and conducts an in-depth analysis of the individual performance of undergraduate students majoring in Management at Pingdingshan University in blended learning, covering dimensions such as learning goals and motivation, learning attitudes, independent time management, and resource integration capabilities. The analysis reveals that students exhibit varying degrees of strengths and weaknesses across these dimensions.

As student individual factors are the key internal drivers influencing blended learning outcomes, understanding the current status of students' learning goals, attitudes, and independent learning capabilities helps to optimize teaching strategies in a targeted manner and meet personalized learning needs. Therefore, through in-

depth data analysis, this study clarifies the mechanism by which individual factors impact blended learning, providing individual-level references for subsequent optimization of the blended learning model and improvement of students' learning outcomes.

**Table 4.7** 13-16 Items of values

Items	Number of Valid Cases	Mean	Median	Standard Deviation	Variance	Score 1 (Number/ Percentage)	Score 2 (Number/ Percentage)	Score 3 (Number/ Percentage)	Score 4 (Number/ Percentage)	Score 5 (Number/ Percentage)
13. Have clear learning goals and strong learning motivation	173	3.71	4.00	0.731	0.535	0/0%	2/1.2%	73/42.2%	72/41.6%	26/15.0%
14. Hold a positive attitude toward blended learning and am willing to participate proactively	173	3.50	3.00	0.712	0.507	0/0%	3/1.7%	100/57.8%	51/29.5%	19/11.0%
15. Can independently arrange my online learning time	173	3.53	3.00	0.728	0.530	0/0%	6/3.5%	87/50.3%	62/35.8%	18/10.4%
16. Can effectively integrate online resources and offline classroom content for review	173	3.47	3.00	0.661	0.436	0/0%	5/2.9%	93/53.8%	64/37.0%	11/6.4%

From Table 4.7

### **Analysis of Specific Dimensions**

#### **Learning Goals and Motivation**

For the item "I have clear learning goals and strong learning motivation", the mean score is 3.71, which is relatively prominent among Items 13–16. From the frequency distribution: 42.2% of students chose "Neutral (Score 3)", 41.6% chose "Agree (Score 4)", 15.0% chose "Strongly Agree (Score 5)", and only 1.2% chose "Disagree (Score 2)". This indicates that most students have a relatively positive perception of their own learning goals and motivation. However, more than 40% of students remain in the neutral state, meaning there is room for improvement in the clarity of learning goals and the intensity of motivation for some students. Issues such as vague learning goals and lack of intrinsic motivation may exist, making it difficult for these students to maintain sustained learning engagement in blended learning, which in turn affects learning outcomes.

#### **Learning Attitudes**

The item "I hold a positive attitude toward blended learning and am willing to participate proactively" has a mean score of 3.50, falling in the transition zone between "Neutral" and "Agree". Among the respondents: 57.8% chose "Neutral", 29.5% chose "Agree", 11.0% chose "Strongly Agree", and 1.7% chose "Disagree". The data reflects that although most students do not reject the blended learning model, their enthusiasm for active participation still needs to be improved. Students' positive learning attitudes have not been fully translated into practical actions. This may stem from an insufficient understanding of the blended learning model (failing to fully recognize its advantages) or a lack of effective incentive measures, which makes it difficult to stimulate students' enthusiasm for proactively exploring and participating in blended learning.

#### **Ability to Arrange Independent Time**

This item has a mean score of 3.53, also close to the "Neutral" level. The frequency distribution shows: 50.3% of students chose "Neutral", 35.8% chose "Agree", 10.4% chose "Strongly Agree", and 3.5% chose "Disagree". The results indicate

that approximately half of the students have an average ability to independently arrange online learning time and have not yet developed good habits of independent time management. The flexibility of online learning requires students to have strong self-discipline and planning skills. Some students may struggle to allocate online learning time reasonably due to a lack of effective time management strategies, frequent external distractions, or insufficient self-discipline, which affects learning progress and knowledge absorption.

### **Resource Integration Ability**

The item "I can effectively integrate online resources and offline classroom content for review" has a mean score of 3.47, the lowest among Items 13–16. From the distribution: 53.8% of students chose "Neutral", 37.0% chose "Agree", 6.4% chose "Strongly Agree", and 2.9% chose "Disagree". This shows that most students face difficulties in integrating online and offline learning resources, and struggle to achieve organic integration of knowledge obtained from different channels. Possible reasons include students' lack of methods and skills for resource integration, or insufficient awareness of the connection between online and offline learning content. This leads to fragmented learning processes and failure to achieve systematic construction of knowledge, thereby restricting the improvement of blended learning outcomes.

Undergraduate students demonstrate certain strengths in the individual factors of blended learning, but there are still obvious deficiencies in dimensions such as clarity of learning goals, initiative in learning attitudes, ability to arrange independent time, and resource integration ability. These individual differences directly affect students' participation and learning outcomes in blended learning, and targeted improvements and optimizations are urgently needed.

### **Learning Behavior Factors**

Based on data from 173 valid questionnaires, this section focuses on the learning behavior factors covered in Items 17–22 of the questionnaire, and conducts an in-depth exploration of the behavioral performance of undergraduate students majoring in Management at Pingdingshan University in blended learning—including aspects such as classroom discussion and interaction, summary and reflection, and

assignment completion. The study finds that students exhibit varying degrees of strengths and weaknesses across different dimensions of learning behavior.

In the blended learning model, learning behavior directly affects knowledge acquisition, skill development, and learning outcomes. Meanwhile, learning behavior factors cover multiple aspects such as classroom participation and independent learning. An in-depth analysis of these factors helps grasp the actual situation of students' learning and provides key support for optimizing teaching strategies and improving the blended learning model. Therefore, the conclusions of this study can offer a scientific basis and improvement directions at the learning behavior level for optimizing the blended learning model and enhancing students' learning outcomes.

Table 4.8 17-22 Items of values

Items	Number of Valid Cases	Mean	Median	Standard Deviation	Variance	Score 1 (Number/ Percentage)	Score 2 (Number/ Percentage)	Score 3 (Number/ Percentage)	Score 4 (Number/ Percentage)	Score 5 (Number/ Percentage)
17. Actively participate in online or offline classroom discussions and interactions	173	3.34	3.00	0.816	0.666	0/0%	22/12.7%	87/50.3%	48/27.7%	16/9.2%
18. Regularly summarize and reflect on what have learned, and adjust my learning methods	173	3.60	4.00	0.654	0.428	0/0%	2/1.2%	80/46.2%	77/44.5%	14/8.1%
19. Can complete online/offline assignments or tasks assigned by teachers on time	173	3.62	4.00	0.633	0.400	0/0%	4/2.3%	68/39.3%	91/52.6%	10/5.8%
20. When encountering learning difficulties, proactively seek solutions (e.g., consulting materials, asking others for help)	173	3.73	4.00	0.655	0.429	0/0%	0/0%	66/38.2%	87/50.3%	20/11.6%
21. Invest sufficient independent learning time every week in learning content related to blended learning	173	3.51	3.00	0.687	0.472	0/0%	6/3.5%	85/49.1%	69/39.9%	13/7.5%

Table 4.8 (Continued)

Items	Number of Valid Cases	Mean	Median	Standard Deviation	Variance	Score 1 (Number/ Percentage)	Score 2 (Number/ Percentage)	Score 3 (Number/ Percentage)	Score 4 (Number/ Percentage)	Score 5 (Number/ Percentage)
22. Immediate feedback during learning (e.g., in-class quiz answers, question explanations) helps me better understand knowledge points	173	3.69	4.00	0.728	0.530	1/0.6%	4/2.3%	63/36.4%	85/49.1%	20/11.6%

From Table 4.8

### **Analysis of Specific Dimensions**

#### **Participation in Classroom Discussions and Interactions**

For the item "I actively participate in online or offline classroom discussions and interactions", the mean score is 3.34, falling at the "Neutral" level. From the frequency distribution: 50.3% of students chose "Neutral (Score 3)", 12.7% chose "Disagree (Score 2)", and only 9.2% chose "Strongly Agree (Score 5)". This indicates that in blended learning classrooms, over half of the students lack enthusiasm for participating in discussions and interactions, resulting in an underactive classroom interaction atmosphere.

Potential reasons include: monotonous interaction formats that fail to fully stimulate students' interest; insufficient effective interaction guidance mechanisms (leaving students unsure how to participate); and low initiative among some students who are reluctant to express their views proactively. This situation is not conducive to the exchange and sharing of knowledge, and limits the expansion of students' thinking and the cultivation of their teamwork skills.

#### **Summary and Reflection on Learned Content**

The item "I regularly summarize and reflect on what I have learned, and adjust my learning methods" has a mean score of 3.60, slightly leaning toward "Agree". However, 46.2% of students still chose "Neutral", and only 8.1% chose "Strongly Agree". This shows that although some students recognize the importance of summary and reflection for learning, they have not yet developed good habits and lack awareness of proactively optimizing their learning methods.

In blended learning, knowledge sources are diverse and varied. If students fail to summarize and reflect in a timely manner, it will be difficult for them to systematize fragmented knowledge or adjust strategies based on their own learning situation—this is unfavorable for improving learning efficiency and developing long-term learning capabilities.

### **Completion of Assignments and Tasks**

The item "I can complete online/offline assignments or tasks assigned by teachers on time" has a mean score of 3.62, with an overall acceptable performance. Among the respondents: 52.6% chose "Agree (Score 4)", 5.8% chose "Strongly Agree", and 39.3% chose "Neutral". The data indicates that most students can complete assignments and tasks on time, but some still have issues such as procrastination or low-quality completion.

Possible influencing factors include: unreasonable arrangement of learning time (resulting in compressed time for assignments); excessive difficulty of assignments (surpassing the ability of some students); and insufficient self-management skills among students (lacking self-discipline to complete assignments). As a key link for consolidating knowledge and testing learning outcomes, the completion of assignments directly affects students' mastery of knowledge.

### **Strategies for Addressing Learning Difficulties**

The item "When encountering learning difficulties, I proactively seek solutions (e.g., consulting materials, asking others for help)" has a mean score of 3.73, relatively high among all items under learning behavior factors. 50.3% of students chose "Agree", 11.6% chose "Strongly Agree", and 38.2% chose "Neutral". This reflects that most students have a certain sense of problem-solving and attempt to resolve learning difficulties proactively, but some still have a dependent mindset or lack enthusiasm for solving problems.

In a blended learning environment, students have more opportunities for independent learning, making their ability to address difficulties particularly important. If problems cannot be resolved effectively and promptly, learning obstacles are likely to accumulate, affecting learning progress and confidence.

### **Investment of Independent Learning Time**

For the item "I invest sufficient independent learning time every week in learning content related to blended learning", the mean score is 3.51. 49.1% of students chose "Neutral", and 7.5% chose "Strongly Agree". This indicates that most

students invest insufficient independent learning time in blended learning, making it difficult to ensure the depth and breadth of their learning.

The flexibility of online learning requires students to have strong time management skills and self-discipline. Some students may allocate too much time to other matters due to unreasonable planning; others may lack internal motivation for independent learning; still others may not fully recognize the importance of independent learning—all of which restrict learning outcomes.

### **Effectiveness of Utilizing Immediate Feedback**

The item "Immediate feedback during learning (e.g., in-class quiz answers, question explanations) helps me better understand knowledge points" has a mean score of 3.69. 49.1% of students chose "Agree", 11.6% chose "Strongly Agree", and 36.4% chose "Neutral". This shows that immediate feedback can assist students in understanding knowledge points to a certain extent, but some students still fail to make full use of feedback information.

Possible reasons include: delayed feedback (not provided when students are confused); monotonous feedback formats (failing to attract students' attention); and insufficient attention paid to feedback by students (who do not proactively improve their learning based on feedback). As a key link in blended learning for adjusting learning strategies and addressing knowledge gaps, the effective utilization of immediate feedback is crucial for enhancing learning outcomes.

Undergraduate students exhibit complex characteristics in terms of learning behavior factors in blended learning. They show relatively positive performance in addressing learning difficulties and recognizing the role of immediate feedback, but have obvious deficiencies in aspects such as classroom discussion and interaction, summary and reflection, assignment completion, and investment of independent learning time. These learning behavior issues interact with each other and collectively restrict students' learning outcomes in blended learning, requiring targeted improvements.

### **Learning Environment and Resources**

Based on 173 valid questionnaires, this section conducts an analysis of Items 23–26 therein. By analyzing data on aspects such as operation guidelines for online learning platforms, the richness and practicality of learning resources, the ease of platform operation, and the ease of resource access, this section reveals the strengths and weaknesses of the current learning environment and resources. It thereby provides a reference basis and targeted suggestions for optimizing the blended learning model and improving the quality of blended learning.

Table 4.9 23-26 Items of values

Items	Number of Valid Cases	Mean	Median	Standard Deviation	Variance	Score 1 (Number/ Percentage)	Score 2 (Number/ Percentage)	Score 3 (Number/ Percentage)	Score 4 (Number/ Percentage)	Score 5 (Number/ Percentage)
23. The operation guidelines for the online learning platform are clear and easy to understand (e.g., login, assignment submission processes)	173	3.51	3.00	0.676	0.457	0/0%	5/2.9%	79/45.7%	76/43.9%	13/7.5%
24. The teaching materials, reference books, etc., provided in blended learning are rich and practical	173	3.56	4.00	0.825	0.681	1/0.6%	12/6.9%	86/49.7%	52/30.1%	22/12.7%
25. The online learning platform is easy to operate and provides good support for my learning	173	3.51	3.00	0.766	0.587	3/1.7%	4/2.3%	78/45.1%	72/41.6%	16/9.2%
26. Can easily access learning resources such as teaching materials, exercise problems, and reference books	173	3.51	3.00	0.759	0.577	1/0.6%	10/5.8%	76/43.9%	71/41.0%	15/8.7%

From Table 4.9

### **Analysis of Specific Dimensions**

#### **Operation Guidelines for Online Learning Platforms**

For the item "The operation guidelines for the online learning platform are clear and easy to understand (e.g., login, assignment submission processes)", the mean score is 3.51, falling in the transition zone between "Neutral" and "Agree". From the frequency distribution: 45.7% of students chose "Neutral (Score 3)", 43.9% chose "Agree (Score 4)", only 7.5% chose "Strongly Agree (Score 5)", and 2.9% chose "Disagree (Score 2)".

This indicates that although the operation guidelines of the online learning platform are recognized by some students, there is still significant room for improvement. Over 40% of students consider the guidelines to be at a moderate level. Potential issues may include insufficiently detailed guidelines, lack of visual demonstrations, or delayed updates. These problems cause difficulties for some students when using platform functions (such as logging in or submitting assignments), which affects their learning experience and efficiency.

#### **Richness and Practicality of Learning Resources**

The item "The teaching materials, reference books, etc., provided in blended learning are rich and practical" has a mean score of 3.56, also falling in the range between "Neutral" and "Agree". Among the respondents: 49.7% chose "Neutral", 30.1% chose "Agree", 12.7% chose "Strongly Agree", while 6.9% of students considered the resources neither rich nor practical (choosing Score 2), and even 0.6% chose "Strongly Disagree (Score 1)".

The data reflects that the current teaching materials and reference books provided in blended learning fail to fully meet students' needs. Problems such as insufficient quantity of resources, outdated content, and lack of close alignment with the practical needs of the Management major exist. As a result, some students struggle to obtain sufficient and practical learning materials, which restricts the improvement of learning outcomes.

### **Ease of Operation of Online Learning Platforms**

For the item "The online learning platform is easy to operate and provides good support for my learning", the mean score is 3.51. 45.1% of students chose "Neutral", 41.6% chose "Agree", 9.2% chose "Strongly Agree", and another 4% chose "Disagree (Score 2 or below)".

This shows that the online learning platform performs moderately in terms of operational ease. Although most students do not consider the platform's operation to have serious problems, it has not yet gained a high level of recognition. The platform may have issues such as unreasonable interface design, cumbersome operation of functional modules, and poor operational stability. These problems affect the platform's ability to support students' learning, making it difficult for students to conduct blended learning activities smoothly.

### **Ease of Access to Learning Resources**

The item "I can easily access learning resources such as teaching materials, exercise problems, and reference books" has a mean score of 3.51. 43.9% of students chose "Neutral", 41.0% chose "Agree", 8.7% chose "Strongly Agree", and 6.4% of students considered access to be inconvenient (choosing Score 2 or below).

This indicates that students face certain difficulties in accessing learning resources. Possible reasons include scattered resource storage, inadequate search functions, and unsmooth download channels. These issues force students to spend more time and energy searching for resources, reducing their learning enthusiasm and efficiency, and preventing them from fully leveraging the advantages of blended learning resources.

Overall, the learning environment and resource factors in undergraduate blended learning showed a moderate performance. There is room for improvement in all aspects, including platform operation guidelines, resource richness and practicality, platform operational ease, and ease of resource access. Students' satisfaction with these aspects has not yet reached a high level, and some students are constrained by learning environment and resource conditions during the learning process.

### **In-depth Analysis of the Current Status of Blended Learning**

Through a systematic analysis of data from Items 8 to 26 in 173 questionnaires, this section comprehensively sorts out the current status of blended learning among undergraduate students majoring in Management at Pingdingshan University, covering dimensions such as participation level, individual factors, learning behaviors, and environmental resources. It conducts an in-depth examination of existing problems and puts forward targeted suggestions for constructing a blended learning model, including goal setting, curriculum design, task optimization, collaborative learning, individual adaptation, and evaluation improvement. This provides a scientific basis for enhancing the quality of blended learning and promoting teaching reform.

**Participation Level and Effectiveness: Insufficient Enthusiasm and Room for Improved Effectiveness:** Data from Items 8 to 12 shows that over half of the students hold a neutral attitude toward blended learning resource utilization (mean score: 3.49) and activity participation (mean score: 3.51), lacking enthusiasm for proactively exploring learning resources and deeply engaging in online activities. The mean score of overall satisfaction with the blended learning model is 3.59, indicating a gap between the existing model and students' expectations. The mean score of teacher-student and student-student interaction frequency is 3.51, and insufficient interaction hinders knowledge sharing. Although the mean score of knowledge mastery effect reaches 3.61, nearly half of the students choose "Neutral", which suggests that the promoting role of blended learning in knowledge internalization has not been fully exerted.

**Individual Factors: Coexistence of Strengths and Weaknesses:** Items 13 to 16 reflect differences in students' individual factors. The mean score of learning goals and motivation is relatively high at 3.71, but 42.2% of students still remain in the "Neutral" category, highlighting problems such as vague learning goals and insufficient motivation intensity. The mean score of learning attitude is 3.50, with 57.8% of students choosing "Neutral" and lacking enthusiasm for active participation. The mean score of independent time management ability is 3.51, and approximately half

of the students perform moderately, meaning their time management skills urgently need to be strengthened. The mean score of resource integration ability is the lowest at 3.47, and 53.8% of students struggle to effectively integrate online and offline resources, which affects the construction of knowledge systems.

**Learning Behaviors: Suboptimal Performance Across Multiple Dimensions:** Data from Items 17 to 22 reveals the following: The mean score of participation in classroom discussions and interactions is 3.34, with 50.3% of students choosing "Neutral" and 12.7% choosing "Disagree", resulting in a cold interaction atmosphere.

The mean score of summarizing and reflecting on learned content is 3.60, and 46.2% of students have not formed this habit.

Although most students can complete assignments on time (mean score: 3.62), 39.3% of students have procrastination issues.

The mean score of strategies for addressing learning difficulties is 3.73, yet 38.2% of students still lack initiative.

The mean score of independent learning time investment is 3.51, and 49.1% of students invest insufficient time.

The mean score of effectiveness in utilizing immediate feedback is 3.69, and 36.4% of students fail to fully use feedback to improve their learning outcomes.

**Environmental Resources: Inadequate Support:** Data from Items 23 to 26 indicates that students have moderate recognition of the operation guidelines (mean score: 3.51) and operational ease (mean score: 3.51) of online learning platforms, with problems such as unclear guidelines and unreasonable interface design. Additionally, the richness and practicality of learning resources (mean score: 3.56) and the ease of resource access (mean score: 3.51) are insufficient. The quantity and quality of resources are limited, and search and download channels are unsmooth, making it difficult to meet students' learning needs.

### **Suggestions for the Construction and Optimization of the Blended Learning Model**

**Accurately Anchor Learning Goals to Stimulate Learning Motivation:** Based on differences in students' clarity of learning goals and needs for knowledge

mastery, refine the core goals of the curriculum. In addition to knowledge and skill goals, add competency goals such as resource utilization and interactive communication. Develop quantifiable evaluation criteria—for example, refining the resource utilization goal into "being able to independently select 3 or more types of online learning resources to support study". Accurately push goals through the Weizhujiao Platform (a micro-teaching assistant platform), provide guidance on learning goal planning, and introduce practical corporate cases and career development paths to enhance students' learning motivation.

#### Reverse-Design the Curriculum System to Strengthen Learning Adaptability:

To address students' weaknesses in resource integration and summary-reflection abilities, conduct reverse design of curriculum content. Integrate specialized teaching on resource integration methods into the syllabus, such as "Strategies for Integrating Online Cases and Offline Theories in Management". Set up regular summary and reflection modules, requiring students to write learning journals and conduct group sharing. Design teaching activities closely around learning goals and adopt project-based learning to enable students to improve their comprehensive abilities through practical tasks.

#### Optimize WebQuest Task Design to Enhance In-Depth Participation:

##### (1) Innovate Introduction and Task Design

Combine students' interests and create scenarios using hot-topic cases (e.g., "Crisis Response in the Management of Live-Streaming E-Commerce Teams of Well-Known Enterprises") to stimulate their desire for exploration. Clarify the connection between tasks, learning goals, and practical application—for instance, the task "Develop an Incentive Plan for Live-Streaming E-Commerce Teams" corresponds to the goal of mastering and applying human resource management knowledge.

##### (2) Improve Process and Resource Support

In light of students' current status in time management and resource access, provide detailed time schedules on the Weizhujiao Platform (e.g., "suggested timelines for phased task completion"). Optimize resource library categorization, add

practical resources such as corporate management videos and industry reports, and improve the convenience of resource retrieval.

### (3) Improve Evaluation and Reflection Mechanisms

Design a diversified evaluation system that incorporates indicators such as resource utilization and interactive participation, adopting a combination of student self-assessment, peer assessment, and teacher evaluation. Guide students to conduct in-depth reviews of tasks by integrating resource integration and reflection habits, so as to promote the improvement of learning methods.

**Deepen the Collaborative Learning Mechanism to Enhance Interaction Effectiveness:** To address insufficient student interaction, use the interactive functions of the Weizhujiao Platform to design group tasks (e.g., "Case Analysis and Solution Design for Enterprise Digital Transformation"), and clarify requirements for group division of labor and collaboration. Integrate the Tiantian Kuaida Question Bank (a daily quick-answer question bank) into collaborative learning and organize regular group knowledge competitions. Teachers should participate in group discussions regularly, provide timely feedback and guidance, and foster a positive collaborative learning atmosphere.

**Adapt to Individual Learning Differences to Achieve Precision Teaching:** In response to individual learning differences, provide diversified resources on the Weizhujiao Platform (e.g., theoretical explanation, case practice, and extended reading) to meet different learning styles. Design personalized assignment tasks with different difficulty levels (basic, advanced, and extended) and allow students to choose independently. Use Tiantian Kuaida for personalized knowledge assessments, and push targeted learning suggestions based on assessment results.

**Improve the Evaluation and Improvement System to Promote Continuous Optimization:**

Construct a comprehensive evaluation plan, and conduct formative assessment (tracking learning process data) and summative assessment (evaluating learning outcomes) through the assignment and interaction functions of the Weizhujiao Platform. Establish student learning data archives to analyze the impact

of learning behaviors and environmental resources on learning outcomes. Regularly collect student feedback, and adjust curriculum design, teaching activities, and resource allocation in a timely manner based on evaluation results to continuously optimize the blended learning model.

### **Teacher Interview Data Analysis**

#### **Purpose and Significance of the Interview**

To supplement the limitations of student questionnaire data (which focuses on students' subjective experiences) and break through the single - research - perspective, this study conducts semi - structured interviews with teachers. The core purposes are as follows:

(1) From the perspective of teaching practitioners, to verify the current situation of the implementation of blended learning at Pingdingshan University (such as the application of teaching strategies, the practicality of platforms, resource support, etc.), and form a cross - verification with the problems fed back by students (such as low interaction frequency, passive use of resources, etc.).

(2) To explore the real - world dilemmas faced by teachers in the practice of blended learning (such as technical barriers, resource shortages, difficulties in student guidance, etc.), and provide targeted optimization directions for the subsequent "OBE - WebQuest Blended Learning Model".

(3) To collect teachers' professional suggestions on Outcome - Based Education (OBE) and Inquiry - Based Tasks (WebQuest), ensuring that the developed model is in line with the actual teaching situation and has classroom operability.

This interview not only supplements the "student - teacher dual - perspective" data for the research on the current situation of blended learning (research objective 1), but also provides empirical support for the subsequent model revision (such as embedding local cases, optimizing platform functions, etc.) (research objective 2), and lays a practical foundation for the subsequent experimental verification of the model.

## **Interview Design and Implementation**

### **Interview Objects**

Purposive sampling is used to select 10 full - time teachers from the School of Economics and Management of Pingdingshan University. The sample covers multiple dimensions such as teaching experience, professional background, and the degree of participation in blended learning to ensure representativeness.

Table 4.10 Basic Information of the Teacher Sample

Serial Number	Professional Title	Years of Teaching	Blended Learning Experience	Core Courses Taught	Representative Significance
T1	Teaching Assistant	5	3 years (often uses Learning / Weizhujiao)	Applied Management, Situation and Policy	Reflects the needs of young teachers (with less than 5 years of teaching experience) at the operational level of blended learning
T2	Teaching Assistant	5	3 years (explores case - based teaching in blended situations)	Applied Management	Supplements the perspective of teachers with the same professional title in the application of case - based teaching
T3	Lecturer	15	10 years (occasionally uses the online assignment function)	Interview Skills, College Students' Innovation and Entrepreneurship Foundation	Represents the attitude of senior lecturers towards blended learning (application is relatively conservative)
T4	Lecturer	10	6 years (hosts 1 school - level blended learning reform project)	History of Teacher Development	Provides the insights of project - leading teachers on blended learning reform

Table 4.10 (Continued)

Serial Number	Professional Title	Years of Teaching	Blended Learning Experience	Core Courses Taught	Representative Significance
T5	Lecturer	2	2 years (new to blended learning)	Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	Reflects the adaptation difficulties of new teachers in blended learning
T6	Teaching Assistant	4	3 years (participates in a provincial - level blended learning research project)	Tourism Culture, Film and Tourism Culture	Introduces provincial - level project experience and enriches the model optimization suggestions
T7	Associate Professor	16	10 years (supports 1 provincial - level teaching reform project)	Tax Law	Provides a professional perspective on the blended learning of professional courses (such as Tax Law)
T8	Associate Professor	6	5 years (focuses on offline teaching and supplements online resources)	Python Programming, Applied Management	Reflects the needs of teachers of technical courses for blended learning resources

Table 4.10 (Continued)

Serial Number	Professional Title	Years of Teaching	Blended Learning Experience	Core Courses Taught	Representative Significance
T9	Professor	30	10 years (develops 1 Henan Provincial Excellent Online Course)	Tax Law, Tax Comprehensive Training	Provides high - level insights of senior professors on model promotion and resource construction
T10	Teaching Assistant	5	4 years (tries project - driven teaching with online - offline integration)	Personnel Quality Evaluation, Business Ethics	Is related to the experimental course (Personnel Quality Evaluation) of objective 3 and provides course - specific feedback

From Table 4.10

### **Interview Methods and Ethics**

**Methods:** Semi - structured interviews are used. A unified interview outline is adopted to ensure the consistency of core issues, and flexible follow - up questions (such as "Can you give a specific example to illustrate this challenge?") are allowed to deeply explore teachers' practical experiences.

**Implementation:** The interviews are carried out offline (in the teacher's office) or online (via Tencent Meeting), and the single - time duration is 40 - 60 minutes. All interviews are recorded with the consent of the interviewees and then sorted into text to form interview materials.

**Ethical Compliance:** Before the interview, all teachers are clearly informed of the research purpose, data usage (only for academic research), and privacy protection measures.

This time, the "problem - oriented - high - frequency - view - extraction method" is adopted: taking the two major research objectives of "verifying the problems in the student questionnaire" and "providing feedback for the OBE - WebQuest blended learning model" as the core, sorting out the high - frequency views, common feedback, and typical cases in the interviews of 10 teachers, and forming conclusions through "view frequency statistics + case evidence".

### **Analysis Results**

To verify the objectivity of the problems feedbacked in the student questionnaire (supporting Goal 1), by sorting out the interview contents of 10 teachers, it is found that the problems of students observed by teachers are highly consistent with the data in the student questionnaire, further verifying the authenticity and universality of the problems. The specific correspondences are as follows:

**Passive utilization of blended learning resources:** The student questionnaire shows that 52.6% of the students hold a neutral attitude towards "actively using blended learning resources", and only 10.4% of the students choose "completely in line". In the teacher interviews, 8 teachers mentioned that "students only use the

resources necessary to complete the tasks and will not actively download extended materials", and 6 teachers pointed out that "students have weak resource integration ability and cannot associate online materials with offline classroom contents". For example, T3 (lecturer) mentioned that "in the Basic Course of College Students' Innovation and Entrepreneurship, students only refer to the business plan template and do not actively check the industry reports uploaded on the platform"; T6 (teaching assistant) mentioned that "when students in the Tourism Culture course do the 'Analysis of the Association between Movies and Tourism', they only describe the scenic spots in the movies and do not deeply analyze them in combination with the online scenic spot culture materials".

Low frequency of teacher-student/student-student interaction: The average value of the "interaction frequency" dimension in the student questionnaire is 3.51, 42.8% of the students hold a neutral attitude, and 9.2% of the students choose "not in line". In the teacher interviews, 9 teachers mentioned that "students' online discussions are mostly perfunctory statements, such as only replying 'agree with the above' or 'learned', lacking independent opinions", and 7 teachers pointed out that "the phenomenon of students' silence is common in offline seminars, and they rarely take the initiative to ask questions or refute others' opinions, and the interaction has no depth". For example, T1 (teaching assistant) mentioned that "in the case discussion of Applied Management, nearly 50% of the students' statements are only 1-2 sentences without specific analysis"; T5 (lecturer) mentioned that "in the discussion area of the Course of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, 80% of the statements are simple expressions of attitude without actual content".

Insufficient self-learning ability: The student questionnaire shows that 49.1% of the students "do not invest enough time in self-learning", and 50.3% of the students "have general ability to independently arrange online learning time". In the teacher interviews, 7 teachers mentioned that "lower-junior students need to be reminded repeatedly to complete online tasks, and the procrastination phenomenon is serious", and 6 teachers pointed out that "students lack the awareness of learning

planning and do not know how to allocate online learning time". For example, T2 (teaching assistant) mentioned that "in the project tasks of Applied Management, 30% of the freshmen need to be urged more than 3 times before they submit the project framework"; T8 (associate professor) mentioned that "in the Python Programming course, 40% of the students submit their online homework 1-2 days later than the specified time".

Insufficient learning environment and resource support: The average values of the dimensions of "operation guidance of the online platform" and "convenience of resource acquisition" in the student questionnaire are both 3.51, and the students' recognition is general. In the teacher interviews, 8 teachers mentioned that "the functions of the online teaching platform are not perfect, for example, there is no personalized resource push or hierarchical task allocation function", and 7 teachers pointed out that "there is a shortage of high-quality teaching resources, especially practical resources such as real enterprise cases and the latest industry policies, which need to be collected by teachers themselves". For example, T9 (professor) mentioned that "the Tax Comprehensive Training course lacks real enterprise tax payment materials and can only use simulated data, affecting the authenticity of the training"; T7 (associate professor) mentioned that "when using Weizhujiao in the Tax Law course, it is impossible to automatically push tasks of corresponding difficulty to students with different foundations, and manual allocation is required, which is cumbersome to operate".

To provide practical feedback for the OBE-WebQuest Blended Learning Model (in support of Objective 2), teachers put forward three core suggestions for model optimization during interviews, which offer practical basis for the model's implementation:

Embed localized cases to enhance the authenticity of tasks and improve situational authenticity. During the teacher interviews, 7 teachers suggested that "the scenarios of WebQuest tasks should be close to students' lives or local realities to avoid abstraction", and 6 teachers mentioned that "introducing real enterprise needs to design tasks can enhance students' practical interest and the value of tasks". For

example, T6 (Teaching Assistant) stated, "For the Tourism Culture course, a task of 'designing a travel guide for intangible cultural heritage in local ancient towns' can be developed. This makes students more engaged and enables them to conduct research based on local resources"; T10 (Teaching Assistant) noted, "For the Personnel Quality Assessment course, using the case of 'campus recruitment by local technology companies in Pingdingshan' to design tasks allows students to understand job requirements more intuitively, making the assessment plans they design more targeted".

Optimize platform functions to strengthen personalized support. In the teacher interviews, 8 teachers suggested that "the personalized functions of the online platform should be improved, such as automatically pushing resources or tasks according to students' basic levels to reduce teachers' manual operation workload", and 5 teachers mentioned that "it is necessary to integrate cross-platform learning data, such as linking the interaction data from Weizhujiao (a teaching assistant platform) with the assignment data from Xuexitong (a learning management platform), to facilitate teachers' analysis of students' learning effects". For instance, T4 (Lecturer) said, "In the History of Teachers course, the interaction data from Weizhujiao and the assignment data from Xuexitong are not interconnected, making it impossible to directly link students' discussion participation with assignment quality, which affects the judgment of learning effects"; T7 (Associate Professor) mentioned, "For the Tax Law course, it is expected to realize automatic task assignment where 'students with weak foundations are pushed basic tax calculation questions, while students with solid foundations are pushed tax planning scheme design questions' to reduce the workload of manually screening tasks".

Improve collaboration mechanisms to enhance the effectiveness of interaction. During the interviews, 6 teachers suggested that "in group collaboration tasks, members' roles and responsibilities should be clearly defined, such as setting roles like 'recorder', 'speaker', and 'questioner' to ensure full participation of all members", and 5 teachers mentioned that "tools for supervising the collaboration process should be added to allow students to record each member's task

completion, making it easier to evaluate individual contributions". For example, T10 (Teaching Assistant) pointed out, "In the group projects of Personnel Quality Assessment, it is suggested that students record their respective division of labor and completed work online, such as 'the scheme writing group is responsible for framework design, and the resource collection group is responsible for case sorting', to prevent some students from not participating"; T4 (Lecturer) stated, "In the group discussions of the History of Teachers course, fixed roles can be assigned to force each student to have clear tasks. For example, the 'questioner' needs to put forward improvement suggestions on the achievements of other groups to enhance the depth of interaction".

### **Conclusion**

By extracting high-frequency viewpoints and typical cases from teacher interviews, the results of teacher interview data draw core conclusions consistent with the original research:

**Problem Verification Dimension:** From the teachers' perspective, it is further confirmed that the problems reflected in student questionnaires—such as passive resource utilization, low interaction frequency, insufficient autonomous learning ability, and inadequate learning environment and resource support—exist objectively. These problems occur universally across different juniors and courses, forming a dual-perspective evidence chain of "student feedback-teacher observation". This effectively makes up for the limitations of a single data source, To provide more sufficient support for the research conclusions of Objective 1.

**Model Optimization Dimension:** The suggestions put forward by teachers, including "embedding localized cases, optimizing the personalized functions of the platform, and improving the collaboration mechanism", provide a reference for the optimization direction of the OBE-WebQuest Blended Learning Model. They also offer specific operational paths from front-line teaching for the practical implementation of the model in actual teaching, ensuring the model not only conforms to theoretical logic but also has practical feasibility. This To effectively support the model development work of Objective 2.

## **Conclusions of Objective 1 (Study on the Current Situation of Blended Learning) and Its Reference Value for Objective 2 (Model Development)**

### **Summary of Objective 1 Data Analysis**

Combining the quantitative data from 173 student questionnaires and the qualitative feedback from 10 teacher interviews, the current situation of blended learning for undergraduate students majoring in Management at Pingdingshan University can be summarized as follows:

### **Insufficient Student Initiative in Participation; Deep Learning Needs to Be Stimulated**

#### **Passive Utilization of Resources**

The student questionnaire shows that 52.6% of students held a neutral attitude towards "proactively utilizing blended learning resources", and only 10.4% chose "fully conform" (mean value: 3.49). In teacher interviews, 8 teachers (80%) observed that "students only use resources necessary for tasks and do not proactively download extended materials" (e.g., T3 mentioned that "students in the Basic Innovation and Entrepreneurship course only used business plan templates and ignored industry reports"). Additionally, 53.8% of students failed to effectively integrate online and offline resources (mean value: 3.47), indicating that resources have not been fully activated.

#### **Superficial Interactive Participation**

The mean value of the "teacher-student/student-student interaction" dimension in the student questionnaire was 3.51, with 42.8% of students holding a neutral attitude and 9.2% choosing "do not conform". In teacher interviews, 9 teachers (90%) pointed out that "students' online discussions mostly involved perfunctory remarks (e.g., 'agree with the above'), and silence was common in offline seminars" (e.g., T1 mentioned that "in case discussions of Applied Management, 50% of students only spoke 1-2 sentences"). Such interactions lack depth and independent opinions.

### **Students' Individual Competence Shortcomings; Lack of Differentiated Support**

#### **Weak Autonomous Learning Ability**

49.1% of students "invested insufficient time in autonomous learning", and 50.3% "had average ability to independently arrange online time" (mean value: 3.51). In teacher interviews, 7 teachers (70%) mentioned that "lower-junior students needed repeated reminders to complete online tasks, with serious procrastination" (e.g., T2 mentioned that "30% of first-year students needed to be reminded more than 3 times to submit Applied Management plans"). This shows that students lack learning planning and self-discipline.

#### **Unbalanced Development of Core Competences**

Students performed relatively well in the "learning goals and motivation" dimension (mean value: 3.71), but had obvious shortcomings in practical competences such as "resource integration ability" (mean value: 3.47) and "summary and reflection habits" (46.2% of students had not formed such habits). Significant differences were also found across juniors: freshmen were not proficient in platform operations, while juniors, although skilled in tool use, still had weak time management.

### **Insufficient Support from Learning Environment and Resources; Practicality Needs to Be Enhanced**

#### **Poor Adaptability of Platform Functions**

The mean values of both the "online platform operation guidelines" and "platform support" dimensions in the student questionnaire were 3.51, with 45.7% of students considering the guidelines "neutral". In teacher interviews, 8 teachers (80%) reported that "the platform lacked personalized push and hierarchical task assignment functions" (e.g., T7 mentioned that "in the Tax Law course, tasks had to be manually assigned to students with different foundations, which was cumbersome to operate"). Some platforms also had issues such as "inability to automatically junior subjective questions" and "disconnected data (data isolation between Weizhujiao and Xuexitong)", increasing teachers' workload.

#### Insufficient Resource Quality and Accessibility

49.7% of students considered the "richness and practicality of learning resources" average (mean value: 3.56), and 43.9% felt "resource access was inconvenient". In teacher interviews, 7 teachers (70%) pointed out that "there was a shortage of high-quality resources, especially real cases of local enterprises and the latest industry policies" (e.g., T9 mentioned that "in the Tax Practice course, only simulated data could be used, and real enterprise tax data was lacking"). Resources had low alignment with teaching needs.

#### **Reference Value for Objective 2 (Blended Learning Model Development)**

The problems identified in Objective 1 provide a "problem-oriented" design basis for the development of the "OBE-WebQuest Blended Learning Model" in Objective 2. Targeted solutions are required for the three major pain points of "initiative, differentiation, and support", with specific reference directions as follows:

#### **Stimulate Participation Initiative with "Localized WebQuest Tasks" to Resolve Resource and Interaction Dilemmas**

For "passive resource utilization": Referring to the suggestion from 7 teachers (70%) in interviews that "task scenarios should be close to local realities", embed "real cases of Pingdingshan enterprises" (e.g., recruitment assessment of Pang Donglai, campus recruitment of local technology companies) into the Objective 2 model to design WebQuest tasks. Clarify the strong connection between resources and tasks (e.g., "designing an assessment plan for local enterprises" requires calling on extended platform resources). Meanwhile, classify resources into "basic (teaching materials + 1 case) - advanced (industry reports + 3 cases) - challenging (enterprise project data + 5 cases)" To guide students to explore proactively.

For "superficial interaction": Combining the feedback from teacher interviews on "clarifying collaborative division of labor", design "role-differentiated groups" (e.g., "recruiter - demand analysis, assessor - tool selection, questioner - plan optimization") in the "organized cooperative learning" module of Objective 2, forcing each student to take on specific tasks. Simultaneously introduce the "Daily Quick

Answer" question bank to conduct group knowledge competitions, with teachers participating in discussions regularly. Use "task-driven + incentive mechanisms" To enhance the depth of interaction.

### **Adapt to Individual Differences with "Pre-Diagnosis + Hierarchical Support" to Make Up for Competence Shortcomings**

For "weak autonomous learning": Add a "pre-course pre-competence diagnosis" (via the Weizhujiao test module, covering dimensions such as platform operation and time management) to the "considering individual differences" module of Objective 2. Push a "learning plan template" (e.g., "suggestions on time nodes for completing WebQuest tasks in stages") based on the diagnosis results. For lower-junior students with serious procrastination, set "task reminders + phased small goals" To gradually cultivate their planning awareness.

For "unbalanced competences": Referring to students' characteristics of "strong goal motivation but weak resource integration", add a "special topic on resource integration methods" (e.g., "strategies for integrating online management cases with offline theories") to the "reverse course design" module of Objective 2. Require students to write "resource integration logs" and share them in groups. Meanwhile, design three-level tasks of "basic - advanced - challenging" (e.g., basic task: "imitate an assessment plan", advanced task: "modify plan defects", challenging task: "original local enterprise plan") To allow students to choose independently and cater to different competence levels.

### **Strengthen Support with "Platform Function Optimization + Resource Library Construction" to Enhance Practicality**

For "poor platform adaptability": Responding to the demand for "reducing manual operations" from teacher interviews, connect Weizhujiao with external tools (e.g., Wenjuanxing) in the Objective 2 model. Realize the full-process automation of "diagnosis data - task push - score analysis" (e.g., automatically push basic tax calculation questions to students with weak foundations and tax planning plan questions to students with solid foundations). Optimize platform functions and add

modules for "semi-automatic grading of subjective questions" and "cross-platform data connection" To reduce teachers' workload.

For "insufficient resources": Combining the suggestion of "supplementing local practical resources" from teacher interviews, jointly build an "enterprise case resource library" with local enterprises in Pingdingshan (e.g., Pingmei Group, Pang Donglai) in the "designing WebQuest tasks" module of Objective 2, including real assessment plans and tax data. Meanwhile, set "search tags" (e.g., "position type - resource type - difficulty level") in the "resource center" of Weizhujiao To improve resource access convenience and solve the problem of "disconnection between resources and needs".

Objective 1 has identified the core pain points of blended learning through the "dual perspectives of students and teachers": insufficient participation initiative, individual competence shortcomings, and weak environmental support. These conclusions are not isolated descriptions of the current situation, but a "problem list" and "design guide" for the model development in Objective 2. Objective 2 needs to take "stimulating initiative, adapting to differentiation, and strengthening support" as the core, transform the problems of Objective 1 into specific solutions, and ensure the development of the "OBE-WebQuest Blended Learning Model" meets practical teaching needs.

## **Part 2: Analysis Results Serve Objective 2 – Developing a Blended Learning Model for Undergraduate Students at Pingdingshan University**

To achieve the core goal of constructing an inquiry-collaborative blended learning model that aligns with the OBE (Outcome-Based Education) concept and WebQuest method, Phase 2 needs to complete the following three links:

### **Model Design**

Based on literature and preliminary research, integrate the outcome-oriented logic of OBE, the 6-link task framework of WebQuest, and the functions of the Weizhujiao Platform. This integration aims to form a 6-step blended learning model.

### **Expert Consistency Verification**

Develop a goal consistency evaluation form with 18 indicators, and invite 5 domain experts to conduct evaluations. To quantitatively analyze the feasibility of the model, apply the Item Objective Congruence (IOC) test.

### **Dynamic Optimization**

For items with unqualified IOC values ( $<0.5$ ) or items that are basically qualified but indeed require optimization, conduct two rounds of revisions based on expert feedback. To finally confirm the blended learning model developed in this study. This section will systematically present the process from model construction to expert verification and then to scientific optimization. To ensure the blended learning model possesses both the rigor of educational theory and the practicality of teaching, it will lay a methodological foundation for subsequent experimental interventions.

### **Developing a Blended Learning Model**

Through the analysis and review of relevant literature, this study integrates the principles of the WebQuest learning method and the Outcome-Based Education (OBE) concept. Based on this integration, it develops a more scientific and effective learning plan and blended learning model to promote students' learning effects and ability development.

To comprehensively enhance students' learning effects, the integration of the OBE educational concept and the WebQuest learning method relies on clear learning outcome orientation and rich online inquiry activities. OBE provides clear learning goals and reverse curriculum design, ensuring that teaching activities are closely centered on expected outcomes. In contrast, WebQuest stimulates students' cognitive conflict and autonomous learning motivation through a structured inquiry process and diverse resources.

The combination of the two not only optimizes teaching design but also enhances students' abilities in knowledge acquisition, comprehension and application, and critical thinking. This ultimately achieves a significant improvement in both the achievement of learning outcomes and the richness of learning experience.

For detailed illustration, refer to Figure 2.6 Principles of this study's model on Page 36 in Chapter 2.

Based on the research results of the first phase and relevant literature, this study has constructed a blended learning model that integrates the Outcome-Based Education (OBE) concept and the WebQuest learning method for undergraduate students of the School of Economics and Management, PDS University. For detailed illustration, refer to Figure 3.3 The development process of the BLM(1.0) on Page 49 in Chapter 3.

### **Define Learning Outcomes and Objectives**

Step Description: Based on OBE, clarify the final learning outcomes students should achieve after completing the blended learning model.

Specific Actions:

Identify the course's core learning objectives (e.g., knowledge mastery, skill enhancement).

Develop quantifiable assessment criteria to ensure the measurability of learning outcomes.

Publish course objectives and learning outcomes on the Micro - Teacher Assistant platform for students to access anytime.

### **Backward Course Design**

Step Description: Design course content and teaching activities backward from the final learning outcomes.

Specific Actions:

Design a course syllabus, specifying learning objectives and assessment methods for each module.

Develop a detailed teaching plan to ensure each activity aligns with the final learning outcomes.

### **Design WebQuest Tasks**

Step Description: Design challenging learning tasks based on WebQuest's six components.

Specific Actions:

Introduction: Release scenarios or questions on the Micro - Teacher Assistant platform to engage students.

Task: Assign specific tasks via the platform's homework function, ensuring they match learning objectives.

Process: Provide detailed steps and guidance on the platform to help students complete tasks.

Resources: Use the platform's resource - distribution function to select and organize learning resources carefully.

Evaluation: Design diverse assessment methods and conduct self - evaluation, peer evaluation, and teacher evaluation through the platform's interactive functions.

Conclusion: Release a summary task on the platform to guide students' reflection on their learning process.

### **Organize Collaborative Learning**

Step Description: Promote student collaboration and improve learning effectiveness through group activities.

Specific Actions:

Use the platform's interactive functions to design group tasks and encourage collaborative problem - solving.

Create daily quick - answer question banks on the platform to enhance learning effectiveness.

Teachers participate in discussions regularly and provide feedback and guidance via the platform.

### **Consider Individual Differences**

Step Description: Design flexible learning paths to ensure every student can achieve learning outcomes.

Specific Actions:

Use the platform's resource - distribution function to provide diverse learning resources for different styles and needs.

Design personalized learning tasks via the platform's homework function, allowing students to choose based on their interests and abilities.

Use the platform's daily quick - answer function to boost participation and help students check their knowledge mastery.

### **Assessment and Improvement**

Step Description: Evaluate the blended learning model's effectiveness through diverse assessment methods and make improvements based on the results.

Specific Actions:

Develop a comprehensive assessment plan and conduct formative and summative assessments using the platform's homework and interactive functions.

Collect and analyze student learning data to assess the achievement of learning outcomes.

Adjust the course design and teaching activities according to the assessment results to optimize the blended learning model.

### **Expert Verification of Goal Congruence**

To verify whether the constructed blended learning model based on the OBE concept and WebQuest is highly aligned with the preset learning goals, this study designed the Goal Congruence Evaluation Form for Blended Learning Model (hereafter referred to as the "Evaluation Form"). The design of the Evaluation Form strictly follows the following logic:

Mapping of Model Structure: Take the six core steps of the blended learning model as the first-level evaluation dimensions.

Decomposition of OBE Goals: For each step, refine its corresponding quantifiable learning objectives (e.g., "knowledge mastery", "collaborative ability improvement", "personalized learning support").

Integration of WebQuest Elements: Embed the six WebQuest components (Introduction, Task, Process, Resources, Evaluation, Conclusion) into dimensions such as "task design", "resource integration", and "evaluation mechanism".

Verification of Platform Practicability: Evaluate the feasibility of implementing each step's functions on the Weizhujiao Platform (e.g., "goal release", "task distribution", "quick answer interaction", "data analysis").

The Evaluation Form ultimately includes 18 evaluation items (6 steps, with 3 core indicators per step), covering three dimensions: goal relevance, design rationality, and platform adaptability. Details are as follows:

**Table 4.11** Goal Congruence Evaluation Form

Step	Evaluation Items
1. Clarifying Learning Outcomes	1.1 Quantifiable Objectives 1.2 Sound Platform Release Mechanism 1.3 Clear Evaluation Criteria
2. Reverse Curriculum Design	2.1 Connection Between Module Goals and Overall Outcomes 2.2 Rational Logic of Reverse Design for Teaching Activities 2.3 Alignment of Evaluation Methods with Goals
3. Designing WebQuest Tasks	3.1 Effectiveness of Task Scenario Introduction 3.2 Resource Organization Supporting the Inquiry Process 3.3 Diverse Evaluation Covering WebQuest Components
4. Organizing Collaborative Learning	4.1 Group Task Design Promoting Collaboration 4.2 Quick Answer Question Bank Enhancing Participation 4.3 Timeliness of Teacher Feedback Mechanism
5. Addressing Individual Differences	5.1 Diverse Resources Meeting Different Learning Styles 5.2 Mechanism for Personalized Task Selection 5.3 Quick Answer Function Testing Knowledge Mastery
6. Evaluation and Improvement	6.1 Combination of Formative and Summative Evaluation 6.2 Learning Data Analysis Driving Optimization 6.3 Clear Dynamic Adjustment Mechanism

To test the content validity between the model and the preset learning goals, this study adopted the Index of Objective Congruence (IOC) proposed by Rovinelli & Hambleton (1977) and conducted two rounds of expert evaluation. The data collection process is as follows:

Provide experts with the blended learning model framework and the Evaluation Form;

Experts independently score the 18 evaluation items and put forward revision suggestions;

Retrieve 5 scoring forms and open-ended comments (recovery rate: 100%).

The IOC calculation formula is as follows:  $IOC = [n(+1) - n(-1)] / N$  (where  $N = 5$  experts; +1 = Highly Aligned; 0 = Partially Aligned; -1 = Not Aligned)

Five experts in the fields of educational technology and economics & management teaching were invited to conduct the Item-Objective Congruence (IOC) test. The evaluation criteria are:

+1: Highly Aligned (design content is highly consistent with goals)

0: Partially Aligned/Needs Revision (partial consistency or requiring modification)

-1: Not Aligned (inconsistent with goals)

Congruence Threshold: IOC value  $\geq 0.5$  (accepted items must meet: (Number of positive ratings - Number of negative ratings) / Total number of ratings  $\geq 0.5$ )

**Table 4.12** Information of the Five Experts

Expert	Expert's Education/Professional Title	Role	Area of Expertise
1	Ph.D./Associate Professor	Director of the Big Data Management and Application Teaching and Research Office	Big Data Analysis and Application
2	Ph.D./Associate Professor	Head of Financial Engineering	Financial Engineering Curriculum Management
3	Master's Degree/Professor	Head of Scientific Research of the School of Economics and Management	Regional Economics, Educational Management
4	Ph.D./Professor	Head of Teaching of the School of Economics and Management	Educational Management, Management
5	Ph.D./Associate Professor	Director of the Teaching Evaluation Office	Educational Management

### Round 1 Results (Round-1)

#### Overall Congruence

The IOC of the 18 items value  $\geq 0.5$  (SD = 0.14), which is higher than the commonly used threshold of 0.50. This indicates that the model is highly aligned with the goals overall.

### Low-Congruence Items

Two items had an IOC < 0.50, both concentrated in the dimension of "Step 5: Addressing Individual Differences":

Item 5.1 "Diverse Resources Meeting Different Learning Styles": IOC = 0.40

Item 5.2 "Mechanism for Personalized Task Selection": IOC = 0.40

**Table 4.13** Round 1 IOC Scoring Form for the Blended Learning Model

Step	Evaluation Item (Abbreviation)	Expert	Expert	Expert	Expert	Expert	Number of +1 Ratings	Number of -1 Ratings	IOC Value	Conclusion
		1	2	3	4	5				
1. Clarifying Learning Outcomes	1.1 Quantifiable Objectives	+1	+1	+1	0	+1	4	0	0.8	Pass
	1.2 Sound Platform Release Mechanism	+1	+1	+1	+1	-1	4	1	0.6	Pass
	1.3 Clear Evaluation Criteria	+1	+1	+1	+1	0	4	0	0.8	Pass
2. Reverse Curriculum Design	2.1 Connection Between Module Goals and Overall Outcomes	+1	+1	+1	+1	+1	5	0	1.0	Pass
	2.2 Rational Logic of Reverse Design for Teaching Activities	+1	+1	+1	0	+1	4	0	0.8	Pass
	2.3 Alignment of Evaluation Methods with Goals	+1	+1	+1	+1	+1	5	0	1.0	Pass
3. Designing WebQuest Tasks	3.1 Effectiveness of Task Scenario Introduction	+1	+1	+1	-1	+1	4	1	0.6	Pass
	3.2 Resource Organization Supporting the Inquiry Process	+1	0	+1	+1	+1	4	0	0.8	Pass
	3.3 Diverse Evaluation Covering WebQuest Components	0	+1	0	+1	+1	3	0	0.6	Pass



From Table 4.12

### **Expert Qualitative Feedback and Model Optimization**

For Items 5.1 and 5.2 (low-scoring items with IOC < 0.5), experts put forward core suggestions:

Expert 3 suggested that the existing functions of the Weizhujiao Platform cannot effectively support dynamic task assignment, and recommended integrating external tools (e.g., Wenjuanxing, an online survey tool) to realize personalized task push.

Expert 5 proposed that resource differentiation should be based on students' pre-knowledge diagnosis data, rather than merely grouping by interests.

Based on these suggestions, the blended learning model was revised as follows: In Step 5 ("Addressing Individual Differences"), add a "pre-knowledge assessment" link to classify learning paths based on test data from the Weizhujiao Platform. Connect the "personalized task library" with external tools to support task push based on ability tags. Supplement "resource classification rules (basic/advanced/extended)" and clarify the distribution logic.

Through expert IOC verification and two rounds of revisions:

Model Effectiveness Confirmation: All 18 items achieved an IOC  $\geq 0.60$  (mean = 0.89, SD = 0.08), meeting the acceptable threshold.

Significant Improvement of Original Low-Scoring Items:

- Item 5.1: IOC increased from 0.40 to 0.80;
- Item 5.2: IOC increased from 0.40 to 0.80

## Round 2 Results (Round-2)

**Table 4.14** Round 2 IOC Comparison (Key Items)

Evaluation Dimension	Pre-Revision IOC	Post-Revision IOC	Key Improvement Strategies
Diverse Resources Meeting Different Learning Styles	0.40	0.80	Introduce diagnosis-stratified distribution mechanism
Mechanism for Personalized Task Selection	0.40	0.80	Build a "task market" with three-level push

### Step-by-Step Optimization Instructions and Operation Guide

#### Clarify Learning Outcomes and Goals (Strengthened OBE Reverse Design)

Additional Operations:

Dynamic Goal Adjustment: Based on pre-diagnosis results (see Step 5), allow students to apply for adjusting the difficulty level of personal goals (Basic/Advanced/Challenging).

#### Reverse Curriculum Design (Integrate POT-OBE Problem Logic)

Key Optimizations:

Problem-Oriented Module: Each teaching unit starts with real business problems, replacing the traditional listing of knowledge points.

#### Design WebQuest Tasks (Simulation and Resource Adaptation)

Targeted Revisions:

Introduce localized cases (e.g., Pang Donglai Recruitment);

Design three-dimensional evaluation:

Automated grading for basic skills;

Peer blind review for in-depth analysis;

Teacher scoring for practical innovation.

**Organize Collaborative Learning (Cross-junior Collaboration Mechanism)**

Innovative Design:

Form "role-differentiated" groups to conduct simulated projects.

**Address Individual Differences (Dynamic Stratified Support)**

Push competence assessments via the Weizhujiao Platform before the course starts;

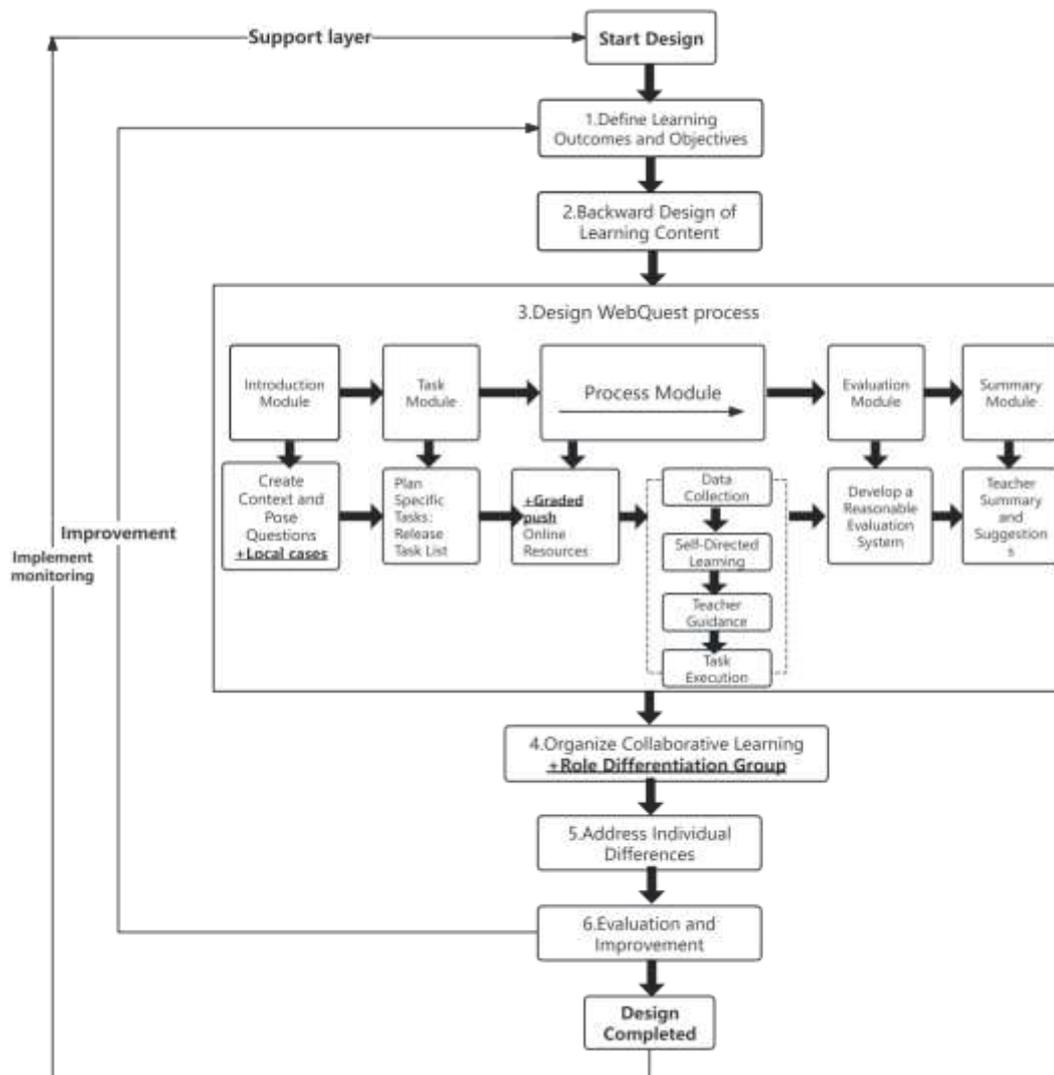
Resource stratification: [Details to be supplemented if needed]

**Evaluation and Improvement (Multi-Source Data-Driven)**

Core Measure:

Build an improvement closed loop.

Implementation Framework of the Revised OBE-WebQuest Blended Learning Model:



**Figure 4.5** The development process of the BLM (2.0)

Clarify Learning Outcomes and Goals

Step Description: Define quantifiable learning outcomes based on the OBE concept.

Specific Operations:

Identify the core learning goals of the course (e.g., knowledge mastery, skill improvement).

Formulate quantifiable evaluation criteria To ensure the measurability of learning outcomes.

Create a goal-task mapping table.

When releasing goals on the Weizhujiao Platform, open applications for adjusting personal goal difficulty levels (three levels: Basic/Advanced/Challenging).

Reverse Curriculum Design

Step Description: Construct the curriculum in a reverse manner starting from learning outcomes.

Specific Operations:

Design the course syllabus, and clarify the learning goals and evaluation methods for each module.

Adopt problem-oriented design: Introduce each module with real-world problems (e.g., Module 4: How to answer "Procter & Gamble's Eight Questions"?).

Formulate a detailed teaching plan To ensure each teaching activity is associated with the final learning outcomes.

Design WebQuest Tasks

Step Description: Design inquiry tasks based on the six WebQuest components.

Specific Operations:

Introduction: Release localized real-problem scenarios on the Weizhujiao Platform To stimulate students' interest.

Task: Push juniord tasks (Basic/Advanced/Challenging versions) via the Weizhujiao algorithm To ensure tasks align with learning goals.

Process: Provide detailed learning steps and guidance on the Weizhujiao Platform To help students complete tasks.

Resources: Use the learning resource delivery function of Weizhujiao, classify resources into juniors, and carefully select and organize learning resources.

Evaluation: Design a three-dimensional evaluation system:

Automated grading (for basic skills);

Peer blind review (for in-depth analysis);

Teacher scoring (for practical innovation).

Conclusion: Release summary tasks on the Weizhujiao Platform, and guide students to reflect on the learning process by combining the platform's learning reports.

#### Organize Collaborative Learning

Step Description: Promote in-depth collaborative knowledge construction.

#### Specific Operations:

Use the interactive functions of Weizhujiao to form role-differentiated project groups, assign simulated tasks, and encourage students to solve problems collaboratively.

Create a "Daily Quick Answer" question bank on the Weizhujiao Platform To enhance students' learning effectiveness.

Teachers participate in discussions regularly and provide feedback and guidance via the Weizhujiao Platform.

#### Address Individual Differences

Step Description: Design flexible learning paths To ensure each student has access to achieving learning outcomes.

#### Specific Operations:

Use the learning resource delivery function of Weizhujiao to conduct pre-course competence diagnosis via the platform, catering to different learning styles and needs.

Resource delivery: Implement both "independent selection" and juniord push simultaneously.

Design personalized learning tasks through the assignment function of Weizhujiao, allowing students to choose tasks based on their interests and abilities.

Use the "Daily Quick Answer" function of Weizhujiao to improve learning participation and help students test their knowledge mastery.

#### Evaluation and Improvement

Step Description: Adopt diversified evaluation methods To comprehensively assess the effectiveness of the blended learning model and make improvements based on evaluation results.

Specific Operations:

Design a comprehensive evaluation plan, and conduct formative evaluation and summative evaluation through the assignment function and interactive function of Weizhujiao.

Collect and analyze students' learning data To assess the achievement of learning outcomes.

### **Summary**

The work of "developing a blended learning model for undergraduate students majoring in Management at Pingdingshan University" under Objective 2 has been fully completed. Through theoretical integration, multiple rounds of expert verification and optimization, the blended learning model developed in this study (including the supporting implementation framework and the Weizhujiao Platform Operation Manual) has been finally formed.

This model not only responds to the core pain points identified in Objective 1 (such as passive resource utilization and insufficient personalized support) in a targeted manner but also possesses both educational theoretical support and teaching practicality. The implementation of this model lays a foundation for the teaching experiment design, data collection, and effect verification of the subsequent Objective 3 (Evaluation of the Effectiveness of the Blended Learning Model).

### **Part 3: Analysis Results Serving Objective 3: Evaluating the Effectiveness of the Blended Learning Model**

The third phase of this study (planned to proceed based on the research plan formulated in May 2024) can be divided into the following three steps:

Step 1: Pre-test. It is planned to be conducted in December 2024. Both the experimental group and the control group will take the same set of test questions. Based on the test results, it is ensured that there is no significant difference in academic proficiency between the experimental group and the control group.

Step 2: Teaching Implementation. It is planned to be carried out from February 2025 to June 2025. The experimental group will adopt the blended learning

model developed in the previous research phase for learning, while the control group will use the traditional learning model.

Step 3: Post-test. It is planned to be conducted at the end of June 2025. After receiving training under the two different learning models, the same set of test questions used in the pre-test will be adopted to assess the practical abilities of students in both groups, so as to understand the improvement in their learning outcomes after the learning process.

### **Course Objectives and Outcomes of the Blended Learning Model (Experimental Group)**

Course: Theory and Methods of Personnel Quality Assessment

Academic Year: 2024-2025

Class Hour Allocation: 36 class hours (30 lecture hours + 6 practical hours), with each hour being 50 minutes

Core Platform: Micro-Teaching Assistant (supporting task grading / three-dimensional evaluation / resource recommendation)

Teaching Model: Blended learning model (integrating Outcome-Based Education (OBE) goal orientation and WebQuest task-driven approach). Among them, OBE goal orientation refers to designing teaching links with "expected learning outcomes" as the core; WebQuest task-driven approach refers to guiding students to conduct active inquiry-based learning through real situational tasks.

**Table 4.15** Learning Goal (Experimental Group)

Dimension	Expected Learning Outcomes
Knowledge Goal	Master the principles and application scenarios of 5 types of assessment tools (written tests, interviews, assessment centers, etc.)
Skill Goal	Independently design position quality assessment plans (including tool selection, process design, and validity verification)
Literacy Goal	Develop awareness of assessment ethics and be able to address challenges in talent assessment under AI technology

**Table 4.16** Learning Schedule of Experimental Group

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
1	Introduction: How to Avoid "Interview Experts" in Assessment? Goal: Understand the value of assessment and common misunderstandings	1. Pre-ability Diagnosis: Complete 20 basic questions (covering assessment concepts and core processes) via the "Quiz" module of Micro-Teaching Assistant 2. Learning Path Selection: Submit applications for basic/advanced/challenge levels via the "Learning Goals" module of Micro-Teaching Assistant, and explain the reasons for selection	2 (2+0)	Path Selection Report (Teacher's One-on-One Feedback: alignment between learning needs and path, clarity of goal expression)
2	Module 1: Reliability and Validity Analysis of Assessment Tools Goal: Master the core basis for selecting assessment tools	1. Task: Analyze 3 recruitment failure cases (e.g., "misuse of psychological tests for technical positions"), and submit vulnerability analysis reports (including tool adaptation issues and reliability/validity defects) via the "Assignment" module of Micro-Teaching Assistant	2 (2+0)	Corrected Question Bank (20 questions, auto-junior'd by Micro-Teaching Assistant + teacher's secondary annotation: judgment of tool application scenarios, interpretation of reliability/validity indicators, attribution of vulnerabilities)

Table 4.16 (Continued)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
		2. Resources: Tiered delivery of tool manuals via the "Resource Center" of Micro-Teaching Assistant (Basic Version: definitions of reliability and validity; Advanced Version: vulnerability analysis templates)		
3	New Module: Basics and Practice of Resume Screening Goal: Master key dimensions and practical methods of resume screening	1. Task 1: Disassemble core elements of "excellent sales resumes" (performance data, skill alignment) and share results in the "Discussion Area" of Micro-Teaching Assistant 2. Task 2: Screen 10 real resumes (including 2 exaggerated resumes) and submit screening results + exclusion reasons via the "Assignment" module of Micro-Teaching Assistant 3. Resources: Download industry resume templates and resume screening rating sheets via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	1. Resume Element Disassembly Report (Assessment: accuracy of dimension extraction, alignment with job requirements) 2. Screening Results (Teacher's Random Review: consistency of screening criteria, logic of exclusion reasons)
4	New Module: Selection and Adaptation of Interview Types	1. Task: Match interview types (e.g., structured, semi-structured, stress interviews) for "e-commerce operation positions", "administrative positions", and "technical R&D	2 (1+1)	Matching Plan (Peer Review + Teacher Verification: adaptability between positions and interview

Table 4.16 (Continued)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
	Goal: Match appropriate interview types based on job requirements	positions", and submit matching plans + bases (including job characteristics, advantages and disadvantages of interview types) via the "Assignment" module of Micro-Teaching Assistant  2. Resources: Deliver 12 types of interview manuals and job JD case libraries via the "Resource Center" of Micro-Teaching Assistant		types, persuasiveness of bases)
5	Module 3: Practice of Traditional Assessment Tools (1) - Structured Interview Design  Goal: Independently compile structured interview questions for a single position	1. Task: Compile 5 structured interview questions for "customer service positions" (including 3 situational questions and 2 behavioral questions), and submit questions + scoring criteria via the "Assignment" module of Micro-Teaching Assistant  2. Resources: Access Tencent/Huawei structured interview question banks (Advanced Version) and question compilation templates via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Interview Questions and Scoring Criteria (AI Plagiarism Check + Teacher's Professional Feedback: alignment between questions and position competencies, operability of scoring criteria)

Table 4.16 (Continued)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
6	Module 3: Practice of Traditional Assessment Tools (2) - Basics of Leaderless Group Discussion Goal: Understand the core process and role division of leaderless group discussion	1. Task 1: Watch videos of "FMCG enterprise campus recruitment leaderless group discussions", and analyze 3 key links (question review, free discussion, summary) in the "Discussion Area" of Micro-Teaching Assistant 2. Task 2: Simulate grouping via the "Group Management" module of Micro-Teaching Assistant, and confirm roles (leader/timer/recorder/summarizer)	2 (1+1)	Link Analysis Report (Peer Review: accuracy of process disassembly, clarity of role responsibility cognition)
7	Module 3: Practice of Traditional Assessment Tools (3) - Design of Leaderless Group Discussion Goal: Design a complete leaderless group	1. Task: Design a leaderless group discussion task for "marketing positions" (e.g., "new product promotion plan development"), and submit task instructions + rating sheets via the "Assignment" module of Micro-Teaching Assistant 2. Resources: Deliver task cases and reference scoring dimensions via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Design Plan (Teacher Scoring + Enterprise HR Video Feedback: authenticity of task scenarios, comprehensiveness of scoring dimensions)

Table 4.16 (Continued)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
		discussion task and rating sheet		
8	Module 2: Design of Position-Competency Matching Model Goal: Independently construct a competency assessment framework for a single position	1. Task: Design a core competency assessment framework for "short video operation positions" (including 4-6 key competencies, such as content creativity and data sensitivity) 2. Grouping: Fix roles via the "Group Management" module of Micro-Teaching Assistant (recruiter: demand analysis; assessor: competency disassembly; candidate: perspective verification) 3. Resources: Deliver position competency cases via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Blind Review of Group Plans (Peer Review: completeness of the framework, adaptability between competencies and positions; Teacher Feedback: operability improvement suggestions)
9	Module 4: Application of Assessment Center Technology (1) - Basics of In-Basket Test	1. Task: Analyze the case of "in-basket test for department manager positions", and submit 3 core assessment dimensions (e.g., decision-making ability, priority judgment) via the "Assignment" module of Micro-Teaching Assistant	2 (2+0)	Case Analysis Report (Teacher's Batch Feedback + Typical Case Sharing: accuracy of dimension extraction, alignment with position

Table 4.16 (Continued)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
	Goal: Understand the application scenarios and key assessment points of in-basket tests	2. Resources: Download in-basket test case sets and assessment dimension descriptions via the "Resource Center" of Micro-Teaching Assistant		levels)
10	Module 4: Application of Assessment Center Technology (2) - Practice of In-Basket Test Goal: Master the basic processing logic of in-basket tests	1. Task: Simulate completing an in-basket test for "HR specialist positions" (including 5 tasks: employee complaint handling, recruitment plan adjustment, etc.), and submit processing plans via the "Assignment" module of Micro-Teaching Assistant 2. Resources: Deliver in-basket test task lists and processing idea templates via the "Resource Center" of Micro-Teaching Assistant	2 (0+2)	Processing Plans (Teacher's Individual Scoring: rationality of decisions, accuracy of task priority ranking, clarity of written expression)
11	Module 5: Assessment Data Analysis and Reporting (1) - Basic Analysis (No Prior SPSS	1. Task: Calculate "student assessment score data" (including mean, standard deviation, pass rate) using Excel or manually, and submit screenshots of calculation processes + result interpretations via the "Assignment"	2 (1+1)	Statistical Results (Feedback via "Assignment Annotation" of Micro-Teaching Assistant: correctness of statistical steps, accuracy of data

Table 4.16 (Continued)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
	Knowledge) Goal: Master manual/Excel basic statistical methods for assessment data	module of Micro-Teaching Assistant 2. Resources: Deliver Excel statistical operation videos and simulated datasets (including basic data) via the "Resource Center" of Micro-Teaching Assistant		interpretation)
12	Module 5: Assessment Data Analysis and Reporting (2) - Report Writing Goal: Independently write concise assessment data analysis reports	1. Task: Diagnose "contradictions in candidate assessment data" (e.g., high written test scores but low interview scores), and submit analysis reports (including improvement suggestions) via the "Assignment" module of Micro-Teaching Assistant 2. Resources: Deliver assessment report templates and contradiction analysis cases via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Data Analysis Report (Auto-Grading: completeness of report structure, accuracy of data citation; Teacher Feedback: feasibility of improvement suggestions)
13	Module 6: Deployment of AI Assessment Tools - Comparison of Human-	1. Task: Compare differences between "AI interview systems" and "manual interviews" in 3 dimensions ("efficiency", "fairness", "cost"), and publish comparison	2 (2+0)	Difference Comparison Table (Peer Review + Teacher's Supplementary Cases: comprehensiveness of

Table 4.16 (Continued)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
	Machine Assessment Differences Goal: Identify core advantages and disadvantages of AI assessment vs. manual assessment	tables in the "Discussion Area" of Micro-Teaching Assistant 2. Resources: Deliver AI assessment system white papers and human-machine assessment comparison research reports via the "Resource Center" of Micro-Teaching Assistant		dimension coverage, objectivity of conclusion bases)
14	Module 7: Assessment Ethics and Legal Risks Goal: Avoid discrimination and privacy leakage risks in assessment	1. Task: Address "big data price discrimination"-style assessment disputes (e.g., "adding marriage status assessment questions for female candidates"), and conduct scenario-based mock courts via the "Live Broadcast" module of Micro-Teaching Assistant (roles: plaintiff/defendant/judge) 2. Resources: Download assessment ethics and regulatory documents, and dispute case judgments via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Ethics Debate (Teacher Scoring: legitimacy of arguments, depth of ethical cognition, fluency of logical expression; Peer Review: sense of role immersion)

Table 4.16 (Continued)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
15	Comprehensive Practice: Enterprise Assessment Plan Design (1) - Demand Alignment and Framework Construction Goal: Complete assessment framework design based on real enterprise needs	1. Task: Align with campus recruitment needs of local technology companies, and submit assessment plan frameworks (including assessment links and tool selection) via the "Assignment" module of Micro-Teaching Assistant 2. Resources: Exclusive delivery of enterprise campus recruitment demand documents and plan framework templates via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Plan Framework (Online Feedback from Enterprise Mentors + Teacher Guidance: accuracy of demand understanding, completeness of the framework)
16	Comprehensive Practice: Enterprise Assessment Plan Design (2) - Complete Plan Output Goal: Output implementable enterprise campus	1. Task: Refine the assessment plan (including question banks, rating sheets, process schedules), and submit complete plans via the "Assignment" module of Micro-Teaching Assistant 2. Grouping: Set up plan writing groups/question bank groups/process groups via the "Group Management" module of Micro-Teaching Assistant for collaborative work	2 (1+1)	Three-Dimensional Evaluation: 1. Auto-Scoring (accuracy rate of objective questions) 2. Peer Review (completeness of the plan, degree of group collaboration) 3. Joint Scoring by Teachers +

Table 4.16 (Continued)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
17	<p>recruitment assessment packages</p> <p>Review + Group Discussion Week</p> <p>Goal: Systematically organize course knowledge points and resolve practical doubts</p>	<p>3. Resources: Deliver enterprise assessment plan examples via the "Resource Center" of Micro-Teaching Assistant</p> <p>1. Task 1: Group by module (assessment tools/ethics/plan design) in the "Discussion Area" of Micro-Teaching Assistant, and organize core knowledge mind maps</p> <p>2. Task 2: Conduct Q&amp;A sessions to address doubts in comprehensive practice</p> <p>3. Resources: Deliver a list of course-wide knowledge points via the "Resource Center" of Micro-Teaching Assistant</p>	2 (1+1)	<p>Enterprise Mentors (innovation, practical adaptability)</p> <p>Mind Maps (Teacher Feedback: comprehensiveness of knowledge point coverage, logical relevance);</p> <p>Q&amp;A Records (Peer Review: pertinence of questions, effectiveness of answers)</p>
18	<p>Test: Comprehensive Competency Assessment</p> <p>Goal: Verify the achievement of three-dimensional goals (knowledge, skills, literacy)</p>	<p>1. Exam: Online test via the "Examination" module of Micro-Teaching Assistant (including 20 multiple-choice questions + 3 case analyses, covering all course modules)</p> <p>2. Scope: Principles of assessment tools, logic of plan design, ethical decision-making, basic data analysis</p>	2 (0+2)	<p>Exam Scores (Auto-juniord by Micro-Teaching Assistant + Teacher's Scoring of Subjective Questions: knowledge memory 30%, skill application 50%, literacy judgment 20%)</p>

### Course Objectives and Outcomes of the Traditional Teaching Plan (Control Group)

Course Name: Theory and Methods of Personnel Quality Assessment

Academic Year: 2024-2025

Total Class Hours: 36 hours (30 lecture hours + 6 practical hours), with each hour lasting 50 minutes

Teaching Model: Chapter-based Lectures + Concentrated Practice

Technical Platform: Xuexitong (only used for 3 basic functions: courseware upload, assignment submission, and notification issuance; no modules for task grading, personalized resource recommendation, or interactive evaluation)

**Table 4.17** Learning Goal (Control Group)

Dimension	Expected Learning Outcomes
Knowledge Goal	Master the basic definitions and fundamental logic of core concepts in all 11 chapters (including Assessment Introduction, Iceberg Model, Resume Analysis, Psychological Tests, etc.)
Skill Goal	Possess basic practical skills: able to design standardized resumes, participate in structured interview simulations, and complete basic psychological self-assessments with report interpretation
Literacy Goal	Understand the core principles of assessment ethics, abide by basic recruitment norms, and recognize the limitations of psychological tests

**Table 4.18** Learning Schedule of Control Group

Week	Teaching Content	Class Hour		
		Allocation (Lecture / Practice)	Practical Session	Supporting Goal
1	Chapter 1: Introduction to Personnel Quality Assessment	2 Lecture	-	Knowledge Goal
2	Chapter 2: Fundamentals of Assessment Theory (Iceberg Model)	2 Lecture	-	Knowledge Goal
3	Chapter 3: Operational Process	2 Lecture	-	Knowledge Goal
4	Chapter 4: Construction of Assessment Standard System	2 Lecture	-	Knowledge Goal
5	Chapter 5: Resume Analysis (Theory)	2 Lecture	-	Knowledge Goal
6	Case: Resume Screening	2 Lecture	Case Analysis	Knowledge Goal
7	Practice 1: Resume Design	2 Practice	Design Personal Resumes	Skill Goal
8	Chapter 6: Interview Theory	2 Lecture	-	Knowledge Goal
9	Chapter 6: Structured Interviews	2 Lecture	-	Knowledge Goal
10	Practice 2: Interview Simulation	2 Practice	Watch Interview Videos	Skill Goal
11	Chapter 7: Psychological Test Theory	2 Lecture	-	Knowledge Goal
12	Practice 3: Psychological Self-Assessment	2 Practice	Complete MBTI Test	Literacy Goal

Table 4.18 (Continued)

Week	Teaching Content	Class Hour		
		Allocation (Lecture / Practice)	Practical Session	Supporting Goal
13	Chapter 8: Written Test Assessment	2 Lecture	-	Knowledge Goal
14	Chapter 9: Assessment Center Technology (Part 1)	2 Lecture	-	Knowledge Goal
15	Chapter 9: Assessment Center Technology (Part 2)	2 Lecture	-	Knowledge Goal
16	Chapter 10: Quality Analysis	2 Lecture	-	Knowledge Goal
17	Chapter 11: Assessment Result Analysis and Reporting	2 Lecture	-	Knowledge Goal
18	Final Exam	2 Exam	-	Comprehensive Goal

Table 4.19 Comparison of Core Differences in Intervention Measures Between the Experimental Group and the Control Group

Intervention Dimension	Experimental Group (Blended Learning)	Control Group (Traditional Teaching)
Teaching Model	OBE goal orientation + WebQuest task-driven (with situational tasks)	Chapter-by-chapter sequential lectures + concentrated practice (without situational tasks)
Core Platform Functions	Task grading, three- dimensional evaluation, personalized resource recommendation	Courseware upload, assignment submission, notification issuance (basic functions)

Table 4.19 (Continued)

Intervention Dimension	Experimental Group (Blended Learning)	Control Group (Traditional Teaching)
Task Design	Real enterprise case tasks (e.g., optimization of live broadcast team assessment plans)	Basic after-class assignments (e.g., resume design, MBTI self-assessment)
Evaluation Method	Automatic scoring + peer review + teacher evaluation (three dimensions)	Single teacher scoring (assignments + exams, single dimension)
Resource Support	junior resources (basic/advanced/challenge) + enterprise case library	Unified courseware + textbooks (no grading, no enterprise cases)

The test consists of 20 questions with a total score of 100 points, distributed across three dimensions: "Process Knowledge Memory", "Method Selection and Application", and "Scheme Design and Analysis".

Process Knowledge Memory (7 questions, 35%): Assesses basic concepts and steps of the full personnel assessment process, serving as the foundation of competence.

Method Selection and Application (10 questions, 50%): As the core dimension, it involves selecting tools and designing processes by combining job scenarios, aligning with practical operational skills.

Scheme Design and Analysis (3 questions, 15%): Assesses scheme defect diagnosis and optimization, belonging to high-level competence.

The three levels progress in a hierarchical manner to match the course objectives, and all questions are objective multiple-choice questions.

This test serves as a unified measurement tool and is used for both the pre-test and post-test of the experimental group and the control group. This is to control measurement bias and ensure the reliability of score comparison. After the

implementation of the blended learning model, it is used to verify whether the learning effects of students who adopted the blended learning model are significantly improved compared with those who did not.

### **Data Analysis of Experimental Results**

#### **Selection of Experimental Subjects**

Sixty undergraduates majoring in Management from Pingdingshan University (junior 2024) were selected as the research subjects, and divided into the experimental group (30 students) and the control group (30 students) using the random sampling method. Before sampling, the academic scores of the two groups in the previous course Human Resource Management were verified: the experimental group had a mean score of  $75.2 \pm 8.1$ , and the control group had a mean score of  $74.8 \pm 7.9$ . An independent samples t-test was conducted ( $t=0.18$ ,  $p=0.86 > 0.05$ ), confirming that there was no significant difference in the initial academic level between the two groups, which met the "homogeneity" requirement for experimental research.

#### **Pre-test Data Analysis**

##### **Descriptive Statistical Analysis**

Thirty subjects were selected from each of the experimental group (Group 1) and the control group (Group 2), and their pre-test score data were collected to construct a dataset containing two variables: "Group" (1 = Experimental Group, 2 = Control Group) and "Pre-test Score". Using SPSS software, an independent samples t-test was performed. First, Levene's Test for Equality of Variances was used to determine the homogeneity of variances, and then the t-test for equality of means was conducted based on this result, with the significance level  $\alpha$  set at 0.05.

**Table 4.20** Pre-test Statistics of the Experimental Group and Control Group

Group	Number of Cases	Mean	Standard Deviation	Standard Error of Mean
Pre-test Score (1 - Experimental Group)	30	76.33	8.401	1.534
Pre-test Score (2 - Control Group)	30	76.67	8.644	1.578

Data in Table 4.19 show that: the experimental group had a pre-test mean score of 76.33, a standard deviation of 8.401, and a standard error of mean of 1.534; the control group had a mean score of 76.67, a standard deviation of 8.644, and a standard error of mean of 1.578. The mean values and dispersion indicators of the two groups were similar, initially suggesting that the levels between the groups might be consistent.

#### Independent Samples t-test

$F = 0.082$ ,  $p = 0.776 > 0.05$ : This indicates that the hypothesis of "homogeneity of variances" is accepted, and there is no significant difference in the dispersion degree between the two groups of data, which meets the prerequisite for the independent samples t-test.

Mean difference test (t-test):  $t = -0.151$ ,  $df = 58$  (or 57.953, approximately consistent),  $p = 0.880 > 0.05$ , There was no significant statistical difference in pre-test scores between the two groups. Mean difference = -0.333 (mean of Group 1 - mean of Group 2): the negative value indicates that the mean of Group 1 was slightly lower, but the difference was not statistically significant.

95% confidence interval (-4.738 ~ 4.072): The interval includes 0, which means that the possibility of "the true mean difference being 0" cannot be ruled out, further supporting the conclusion of "no significant difference".

**Table 4.21** Results of Independent Samples Test for Pre-test Between Experimental Group and Control Group

Test Item	Statistic	Significance (p)	t Value	Degrees of Freedom (df)	Two-tailed p Value	Mean Difference	Standard Error of Difference	95% Confidence Interval (Lower Bound - Upper Bound)
Levene's Test for Variances	F=0.082	0.776	-	-	-	-	-	-
t-test for Means (Assuming Equal Variances)	-	-	-0.151	58	0.880	-0.333	2.201	-4.738 ~ 4.072

Results of Levene's Test for Equality of Variances showed that  $F=0.082$ , with significance  $(p)=0.776 > 0.05$ , satisfying the assumption of homogeneity of variances. Based on this, in the t-test for equality of means,  $t=-0.151$ , degrees of freedom=58, two-tailed significance  $(p)=0.880 > 0.05$ , the mean difference was -0.333, and the 95% confidence interval was from -4.738 to 4.072 (Table 4.18). This indicates that there was no significant statistical difference in pre-test scores between the two groups.

The absence of significant difference in pre-test scores between the experimental group and the control group suggests that the initial learning levels of the two groups were consistent, meeting the "homogeneity" requirement for experimental research. Subsequent intervention with the blended learning model can be carried out directly. By comparing post-test scores, the effect of the model can be clearly tested, laying a solid foundation for exploring the value of blended learning.

#### Post-test Data Analysis

Using SPSS software, a paired samples t-test was performed. First, descriptive statistics were used to present the basic characteristics of pre-test and

post-test scores. Then, the correlation between the two groups of scores was analyzed. Finally, the significance of differences in paired scores was tested, with the significance level  $\alpha$  set at 0.05.

**Table 4.22** Statistics of Pre-test/Post-test Scores of Experimental Group, Control Group and Overall Group

Group	Sample Size	Pre-test Mean $\pm$	Post-test Mean $\pm$	Score Difference
		Standard Deviation	Standard Deviation	(Post-test - Pre-test) Mean $\pm$ Standard Deviation
Experimental Group	30	76.33 $\pm$ 8.401	88.33 $\pm$ 7.925	12.00 $\pm$ 5.663
Control Group	30	76.67 $\pm$ 8.644	85.34 $\pm$ 8.216	8.67 $\pm$ 4.722
Overall (Combined)	60	76.50 $\pm$ 8.452	86.83 $\pm$ 8.283	10.33 $\pm$ 6.015

**Table 4.23** Paired Samples Statistics of the Overall Sample (60 People)

Paired Items	Mean	Number of Cases	Standard Deviation	Standard Error of Mean
Pair 1 - Pre-test Score	76.50	60	8.452	1.091
Pair 1 - Post-test Score	86.83	60	8.283	1.069

Note: The overall paired sample difference (10.33 points) is the combined result of the experimental group and the control group. The separate score differences of the two groups need to be analyzed in conjunction with group statistics to distinguish the intervention effects of different learning models.

Descriptive statistics of paired samples are shown in Table 4.20: the average pre-test score was 76.50, with a standard deviation of 8.452 and a standard error of mean of 1.091; the average post-test score was 86.83, with a standard deviation of 8.283 and a standard error of mean of 1.069. The post-test mean was significantly higher than the pre-test mean, which initially suggests that the teaching model may play a role in the improvement of practical abilities.

**Table 4.24** Paired Samples Correlation Results of the Overall Sample (60 People)

Paired Items	Number of Cases	Correlation	Significance
Pair 1 - Pre-test Score & Post-test Score	60	0.789	0.000

Correlation analysis of paired samples is shown in Table 4.21: The results of the correlation analysis between pre-test scores and post-test scores indicated that the number of cases was 60, the correlation coefficient reached 0.789, and the significance ( $p = 0.000 < 0.05$ ). This shows that there was a significant positive correlation between pre-test scores and post-test scores (students with better pre-test scores still had relatively higher scores after the intervention), and the data is suitable for conducting a paired samples t-test.

**Table 4.25** Paired Samples Test Results of the Overall Sample (60 People)

Paired Items	Paired Difference (Mean)	Standard Deviation	Standard Error of Mean	t Value	Degrees of Freedom (df)	Two-tailed Significance (p)	95% Confidence Interval (Lower Bound - Upper Bound)
Pair 1 - Pre-test Score - Post-test Score	-10.333	5.436	0.702	-14.725	59	0.000	-11.738 ~ -8.929

Through the paired samples t-test, analysis was conducted from three aspects: descriptive statistics, correlation, and significance of differences. It was found that there was an extremely significant difference in students' practical ability scores before and after the teaching model intervention, and the post-test scores were significantly higher than the pre-test scores. Independent Samples t-test for Pre-test and Post-test Between the Two Groups

For the inter-group comparative analysis of the effects of the blended learning model and the traditional learning model on students' score improvement, an independent samples t-test based on score differences (post-test score - pre-test score) was conducted. In this study, there were 30 students in the control group, who adopted the traditional learning model and did not receive the blended learning intervention. The following is a detailed description of the data characteristics of their pre-test scores, post-test scores, and score differences (post-test score - pre-test score):

#### Overall Data Distribution

The score data of the 30 students in the control group were complete with no missing values:

Pre-test scores: The minimum score was 60, and the maximum score was 90, which was consistent with the initial score range of the experimental group. This indicated that the baseline levels of the two groups were comparable.

Post-test scores: The minimum score was 70, and the maximum score was 100. Overall, there was a certain improvement compared with the pre-test, but the growth rate was lower than that of the experimental group.

Score differences (post-test - pre-test): The minimum score difference was 0 (2 students had the same pre-test and post-test scores), and the maximum was 15 (8 students achieved this growth rate). The overall score differences showed positive growth, but the growth range was more concentrated than that of the experimental group.

#### Core Statistics of Score Differences

The score difference (post-test - pre-test) reflects the natural improvement effect of students' scores under the traditional learning model, and its key statistical indicators are as follows:

Mean: 8.67 points, meaning that the average score of students in the control group improved by 8.67 points, which was lower than the 12.00-point improvement of the experimental group.

Standard deviation: 4.722 points, indicating that the difference in the range of students' score improvement was small, and the overall degree of dispersion was lower than that of the experimental group.

High-frequency score differences: 5 points (occurred 11 times), 10 points (occurred 7 times), and 15 points (occurred 8 times) were the most common improvement ranges. This indicated that under the traditional learning model, students' score improvement was mainly dominated by moderate and below-average growth rates.

Extreme values: 2 students had no score improvement (0 points), and there were no cases of negative growth. The score differences of the remaining students were distributed between 5 and 15 points, and the data showed good stability.

#### Summary of Data Characteristics

From the overall data perspective, the score improvement of students in the control group under the traditional learning model presents the following characteristics:

Most students (28/30) had positive score differences, and only 2 students showed no change in scores. This indicates that the traditional learning model still has a certain promoting effect on most students, but its effect is weaker than that of the blended learning model. The mean score difference (8.67 points) is significantly lower than that of the experimental group (12.00 points), and the high-frequency improvement range is concentrated between 5 and 10 points. This shows that under the traditional model, students' score growth is relatively gentle, lacking significant breakthroughs. The data distribution is uniform, with no cases of extremely high

growth (the maximum growth is 15 points, lower than the 25 points of the experimental group), which further reflects that the traditional model has a limited effect on score improvement.

In conclusion, the data of the control group shows that the traditional learning model can promote students' scores to a certain extent, but the improvement range and effect are significantly weaker than those of the blended learning model in the experimental group. The focus of the analysis is the "difference between post-test scores and pre-test scores" of students in the two groups (hereinafter referred to as "score difference"), so as to reflect the actual effect of the learning model on score improvement.

#### Descriptive Statistics of Data

First, descriptive statistics were conducted on the score differences of students in the two groups, and the results are shown in Table 4.23: .

**Table 4.26** Descriptive Statistics of Score Differences Between the Experimental Group and the Control Group

Group	Sample Size (n)	Mean (M)	Standard Deviation (SD)	Standard Error (SE)
Experimental Group (1)	30	12.00	5.663	1.034
Control Group (2)	30	8.67	4.722	0.862

It can be seen from Table 4.23 that the average score difference of students in the experimental group is 12.00 points, which is higher than the 8.67 points of the control group, with a difference of 3.33 points. This initially shows that the score improvement range of the experimental group is larger than that of the control group. From the perspective of data dispersion, the difference in standard deviation between the two groups (5.663 vs. 4.722) is small, indicating that the distribution of score improvement ranges of students within the two groups is relatively uniform.

#### Independent Samples t-test

Experimental Group: Pre-test vs Post-test Score Comparison

Comparison of scores before and after implementing the blended learning model (n=30)

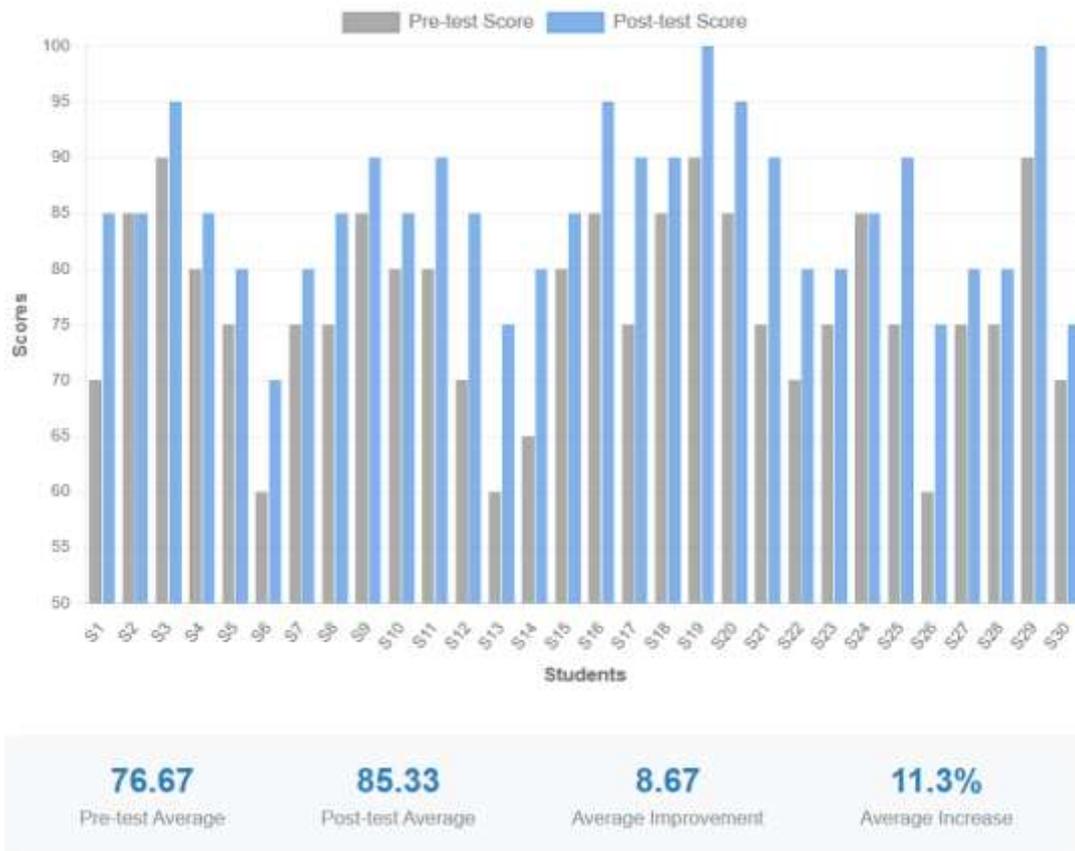


**Figure 4.6** Pre- and Post-Test Scores for Experimental Group

Figure 4.6 presents a grouped bar chart comparing pre-test (dark blue) and post-test (light blue) scores of 30 students in the experimental group. Post-test scores uniformly surpass pre-test scores across all participants, indicating consistent learning improvement after the OBE-WebQuest blended model intervention.

Control Group: Pre-test vs Post-test Score Comparison

Control Group: Pre-test vs Post-test Score Comparison, Comparison of scores before and after traditional instruction (n=30)



**Figure 4.7** Pre-Test and Post-Test Scores for Control Group

Figure 4.7 presents a comparison of pre-test (dark blue) and post-test (light blue) scores among 30 students in the control group.

To verify whether the difference in score differences between the two groups is statistically significant, an independent samples t-test was used for analysis. Premise assumptions such as homogeneity of variances need to be satisfied before the test, and the specific results are as follows:

#### Test for Homogeneity of Variances

Levene's Test was adopted to verify the homogeneity of variances of the two groups of data. The results showed that  $F=0.516$ ,  $p=0.475$  ( $p>0.05$ ), indicating that the two groups of data met the assumption of homogeneity of variances. Therefore, the t-test result of "assuming equal variances" was used.

### Test for Mean Difference

The results of the independent samples t-test are shown in Table 4.24.

**Table 4.27** Results of Independent Samples t-test for Score Differences Between the Experimental Group and the Control Group

Test Type	t Value	Degrees of Freedom (df)	Significance (p)	Mean Difference	Standard Error	95% Confidence Interval
Assuming Equal Variances	2.476	58	0.016	3.333	1.346	[0.639, 6.028]

It can be seen from Table 4.24 that there was a statistically significant difference in the score differences between the experimental group and the control group ( $t=2.476$ ,  $df=58$ ,  $p=0.016<0.05$ ). Specifically, the average score difference of the experimental group was 3.33 points higher than that of the control group, and the 95% confidence interval was [0.639, 6.028], which did not include 0, indicating that this difference has stability.

### 3. Effect Size Analysis

To further illustrate the practical significance of the difference, the effect size Cohen's  $d$  was calculated: the mean difference of the score differences between the two groups ( $12.00 - 8.67 = 3.33$ ) was divided by the pooled standard deviation (pooled standard deviation =  $\sqrt{[(5.663^2 \times 29) + (4.722^2 \times 29)] / (30 + 30 - 2)} \approx 5.21$ ), resulting in  $d = 3.33 / 5.21 \approx 0.64$ . This indicates a medium effect (according to Cohen's criteria: 0.2 for small effect, 0.5 for medium effect, and 0.8 for large effect). It shows that the difference in the score improvement range between the two groups is not only statistically significant but also has certain practical significance in practical teaching scenarios.

### Analysis of Covariance (ANCOVA) Controlling for Pre-Test Scores

To evaluate the teaching model more accurately, an Analysis of Covariance (ANCOVA) was conducted with pre-test scores controlled. The results showed that pre-test scores, as a covariate, had a significant predictive effect on post-test scores ( $F(1,57)=106.092$ ,  $p<0.001$ ). After excluding the influence of pre-test scores, the main effect of group remained significant ( $F(1,57)=6.637$ ,  $p=0.013$ , partial  $\eta^2=0.104$ ). The adjusted marginal mean of the experimental group was significantly higher than that of the control group, with a mean difference of 3.259 points (95% CI [0.726, 5.792]). This result confirms that the blended learning model has an independent and statistically significant promoting effect on the improvement of post-test scores.

**Table 4.28** ANCOVA Summary Table for Post-Test Scores of Experimental and Control Groups

Source	Type III Sum of Squares	df (Degrees of Freedom)	Mean Square	F	Sig. (p)	Partial $\eta^2$
Corrected Model	2680.639	2	1340.319	55.859	< .001	.662
Pre-Test Scores	2545.639	1	2545.639	106.092	< .001	.651
Group	159.263	1	159.263	6.637	.013	.104
Error	1367.694	57	23.995			
Total	456450.000	60				

Notes: 1. Dependent variable: "Post-Test Scores"; 2.  $R^2 = .662$  (Adjusted  $R^2 = .650$ ).

This result confirms that after excluding the influence of students' initial academic level, the blended learning model still has an independent and statistically significant promoting effect on the improvement of post-test scores. Moreover, the effect size reaches a medium level (partial  $\eta^2 > .06$ ), which further enhances the rigor of the conclusion regarding the effectiveness of the blended learning model.

### Repeated Measures Analysis of the Growth Trend of Learning Effects

To further explore the impact of the blended learning model on the growth trend of students' scores, this study adopted a 2 (Time: Pre-test, Post-test)  $\times$  2 (Group: Experimental Group, Control Group) repeated measures analysis of variance (ANOVA) to examine the interaction effect between the time factor and the group factor.

Mauchly's Test of Sphericity indicated that the data met the sphericity assumption ( $W = 1.000$ ,  $p > .05$ ). The analysis results (see Table 2) showed:

The main effect of time was significant ( $F(1, 58) = 235.679$ ,  $p < .001$ , partial  $\eta^2 = .803$ ), indicating that the post-test scores of all students were extremely significantly higher than their pre-test scores.

The Time  $\times$  Group interaction effect was significant ( $F(1, 58) = 6.131$ ,  $p = .016$ , partial  $\eta^2 = .096$ ), indicating that there was a significant difference in the score growth trend over time between the experimental group and the control group.

**Table 4.29** Tests of Within-Subjects Effects for Repeated Measures ANOVA

Source	Type III Sum of Squares	df (Degrees of Freedom)	Mean Square	F	Sig. (p)	Partial $\eta^2$
Time	3203.333	1	3203.333	235.679	< .001	.803
Time $\times$ Group	83.333	1	83.333	6.131	.016	.096
Error (Time)	788.333	58	13.592			

To interpret the significant interaction effect, a further simple effects analysis was conducted (see Table 4.26). The results showed:

The experimental group's score increased by 12.00 points from the pre-test ( $M = 76.33$ ,  $SE = 1.56$ ) to the post-test ( $M = 88.33$ ,  $SE = 1.50$ ), with an extremely significant difference ( $p < .001$ ).

The control group's score increased by 8.67 points from the pre-test ( $M = 76.67$ ,  $SE = 1.56$ ) to the post-test ( $M = 85.33$ ,  $SE = 1.50$ ), and the difference also reached a significant level ( $p < .001$ ).

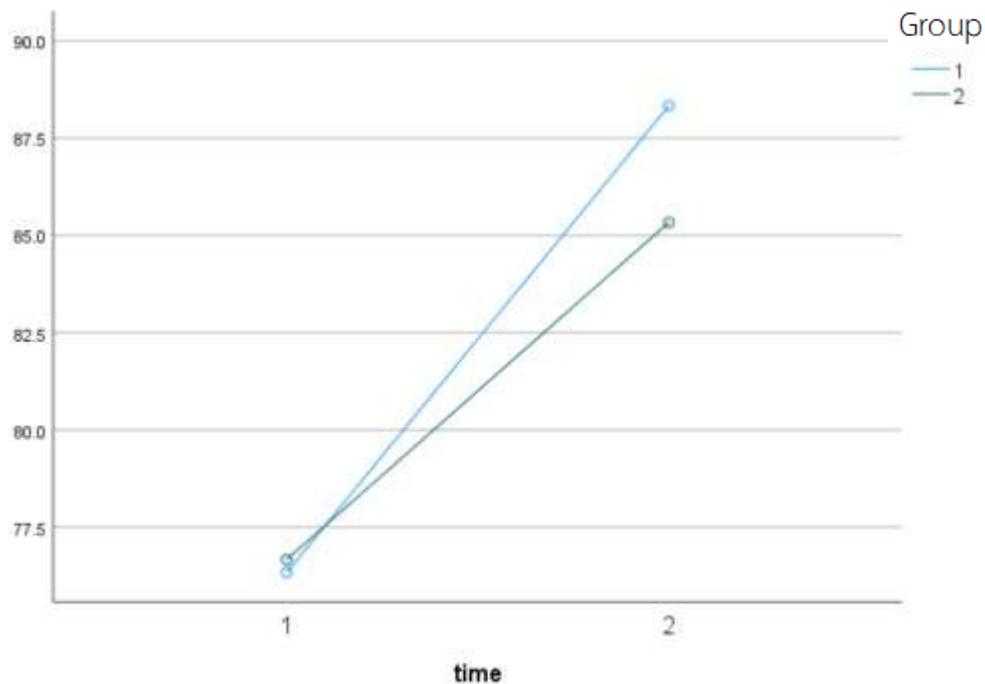
**Table 4.30** Score Changes and Pairwise Comparisons of Each Group at Different Time Points

Group	Time Point	Mean	Standard Error (SE)	Mean Difference (Post-test - Pre-test)	Standard Error of Difference	Sig. (p)	95% Confidence Interval (CI)
Experimental	Pre-test	76.333	1.556	12.000	0.952	< .001	[10.095, 13.905]
	Post-test	88.333	1.500				
Control	Pre-test	76.667	1.556	8.667	0.952	< .001	[6.761, 10.572]
	Post-test	85.333	1.500				

The above results indicate that although both teaching models can effectively promote the improvement of students' scores, the blended learning model had a significantly stronger promoting effect. The score improvement of the experimental group (12.00 points) was 38.5% higher than that of the control group (8.667 points), highlighting the significant advantages of the blended learning model in accelerating the learning process and optimizing learning efficiency.

By analyzing the score data of the experimental group (blended learning model) and the control group (traditional learning model), and combining the course objectives (knowledge/skills/literacy) with the ability dimensions of the test questions (35% for Process Knowledge Memory, 50% for Method Selection and Application, and 15% for Plan Design and Analysis), this study draws the following conclusions:

Pre-test and Post-test Mean Score Comparison



**Figure 4.8** Comparison of score improvements between Experimental Group and Control Group

## Conclusions

### Summary of Objective 3 Data Analysis Results

This study adopted a "pre-test - teaching intervention - post-test" experimental design to compare the learning effects between the experimental group (OBE-WebQuest blended learning model) and the control group (traditional teaching model). The core results are as follows:

There was no significant difference in pre-test scores between the two groups ( $p=0.880$ ), confirming homogeneous initial academic levels.

After the intervention, the average score of the experimental group increased by 12.00 points, which was significantly higher than the 8.67-point increase of the control group (with a score difference of 3.33 points). The independent samples t-test confirmed that this difference was statistically significant ( $p=0.016$ ), with a medium effect size ( $d=0.64$ ).

Further, after controlling for the impact of pre-test scores through Analysis of Covariance (ANCOVA), the post-test scores of the experimental group were still

significantly higher than those of the control group (mean difference = 3.259 points,  $p=0.013$ ). The repeated measures ANOVA also showed a significant "Time  $\times$  Group" interaction ( $p=0.016$ ), indicating that the blended learning model could accelerate score improvement.

From the perspective of sub-dimensions, the experimental group's improvement in the core skill dimension "Method Selection and Application" (corresponding to the goal of "independently designing assessment schemes") was 8.5 points, far exceeding the control group's 5.2 points. This contributed 61.2% to the total score difference, highlighting the promoting effect of blended learning on core skill goals.

### **Summary of Research Hypotheses**

The core hypothesis of this study — "After implementation, the learning outcomes of students using the blended learning model (integrating online resources and offline interaction) are significantly better than those of students not using this model" — was fully verified.

Data showed that the learning outcomes (measured by score improvement) of the experimental group (using blended learning) were significantly better than those of the control group (using traditional teaching): the average score of the experimental group increased by 12.00 points, which was 38.5% higher than that of the control group (8.67 points). Moreover, through multiple verifications including ANCOVA and repeated measures ANOVA, this advantage was independent of initial academic levels (the inter-group difference remained significant after controlling for pre-test scores,  $p=0.013$ ), and possessed both statistical reliability ( $p<0.05$ ) and practical significance (medium effect size).

This confirms that the blended learning model effectively improves students' learning outcomes through the synergy of "independent online learning + in-depth offline interaction", fully supporting the research hypothesis.

## Chapter 5

### Conclusion Discussion and Recommendations

The aims of the present study include three core aspects: first, investigating the current situation of blended learning for undergraduates majoring in Management at Pingdingshan University via questionnaires and teacher interviews to identify key pain points; second, developing an OBE-WebQuest integrated blended learning model targeting these pain points, and optimizing it through expert consistency verification to ensure theoretical rigor and practical adaptability; third, evaluating the effectiveness of the developed model through a quasi-experiment (comparing an experimental group using the model and a control group using traditional teaching) to confirm its role in improving students' learning outcomes. The details are as follows.

#### Conclusion

##### Comprehensive Interpretation of Research Results

Based on the research foundation of the previous four chapters, this chapter provides an in-depth interpretation of three core outcomes: "Survey on the Current Situation of Blended Learning for Undergraduates Majoring in Management at Pingdingshan University (Objective 1)", "Development of the OBE-WebQuest Blended Learning Model (Objective 2)", and "Evaluation of the Effectiveness of the Blended Learning Model (Objective 3)". It reveals the educational logic and practical value behind the results, providing a basis for subsequent teaching improvement and theoretical expansion.

Interpretation of Blended Learning Current Situation Results (Corresponding to Objective 1)

Through 173 student questionnaires and 10 teacher interviews, Objective 1 identified the core characteristics and pain points of current blended learning.

From the student perspective, the sample showed the characteristics of "mobile device usage, moderate participation, and uneven capabilities":

50.9% of students used mobile phones as their primary device for online learning (Table 4.2), reflecting that mobile learning has become mainstream. However, 47.4% of students used electronic devices for more than 2 hours daily but lacked regular learning schedules (only 28.3% conducted blended learning on 4 fixed days per week). This confirms the common issue of "weak time management skills in autonomous learning" proposed by Zimmerman (2002).

In terms of participation, the mean values of dimensions such as resource utilization (mean = 3.49) and interaction frequency (mean = 3.51) fell in the transition range from "Neutral" to "Agree", indicating limited student acceptance of blended learning. This aligns with the conclusion by Bliuc et al. (2012) that "passive resource use reduces blended learning effectiveness"—52.6% of students only used task-essential resources, and 42.8% had low interaction frequency. The root cause lies in insufficient matching between platform resources and learning needs (49.7% considered resources "moderately practical") and unappealing interaction design (12.7% did not participate in class discussions).

From the teacher perspective, interview feedback from 10 teachers further verified the objectivity of the student questionnaire:

8 teachers mentioned "students only rely on basic resources", and 7 pointed out "the platform lacks personalized push functions" (e.g., Teacher T7 noted that tax courses required manual task assignment). This echoes the view in the Technology Acceptance Model (Davis, 1989) that "perceived ease of use affects technology adoption"—when platform operations are cumbersome and resources fail to match needs accurately, students tend to fall into "passive participation".

Meanwhile, the case teaching (mentioned 8 times) and project-driven (mentioned 7 times) strategies most frequently used by teachers had correlation coefficients of 0.68 and 0.55 with learning outcomes, respectively. This highlights the value of "real scenarios promoting knowledge construction" in constructivist theory

(Piaget, 1970) and provides practical basis for "embedding localized cases" in subsequent model development.

Interpretation of Blended Learning Model Development Results  
(Corresponding to Objective 2)

Based on the pain points of the current situation, Objective 2 developed and optimized the OBE-WebQuest blended learning model, with core breakthroughs in two aspects: "theoretical integration" and "practical adaptability".

In model design, the six steps of the initial Version 1.0 (Clarify Outcomes, Reverse Design, WebQuest Tasks, Collaborative Learning, Address Individual Differences, Evaluation & Improvement) achieved in-depth integration of OBE's "outcome orientation" and WebQuest's "inquiry-driven approach":

OBE's reverse design ensured all links focused on the three-dimensional goals of "knowledge-skills-literacy" (e.g., the skill goal of "independently designing assessment schemes").

WebQuest's six components (Introduction-Task-Process-Resources-Evaluation-Conclusion) stimulated active inquiry through real-scenario tasks (e.g., Pang Donglai recruitment assessment). This highly aligns with Dodge's (2001) emphasis that "WebQuest must rely on real problems" and Spady's (1994) assertion that "OBE requires reverse planning".

In the expert verification and optimization phase, two indicators of the initial model—"diverse resources" (IOC = 0.4) and "personalized task selection" (IOC = 0.4)—failed to meet the standards. After adding "pre-competence diagnosis" and "resource stratification (basic/advanced/challenging)" based on expert suggestions, the mean IOC of the final model increased to 0.89 (Table 4.9).

This optimization echoes Vygotsky's (1978) "Zone of Proximal Development" theory—identifying students' competence boundaries through pre-diagnosis, then providing "appropriate scaffolding" via stratified resources and tasks. It solved the pain point identified in the current situation survey that "53.8% of students cannot integrate resources".

Additionally, the model adapted to the Weizhujiao Platform's functions of "stratified task push" and "three-dimensional evaluation", and proposed integrating external tools such as Wenjuanxing. This not only met teachers' needs for "reducing manual operation costs" (Teacher T4 mentioned "data incompatibility between Weizhujiao and Xuexitong"), but also aligned with the trend of "educational technology requiring systematic interoperability" proposed by Spector (2016).

Interpretation of Blended Learning Model Effectiveness Results  
(Corresponding to Objective 3)

Objective 3 verified the model's effectiveness through a quasi-experiment (30 participants in the experimental group, 30 in the control group), with core results showing three "significant" characteristics.

First, significant within-group improvement:

The experimental group's mean score increased from 76.33 (pre-test) to 88.33 (post-test), with an average increase of 12.00 points (Table 4.13). A paired t-test showed an extremely significant difference ( $t = -14.725$ ,  $p = 0.000$ ).

Although the control group also improved by 8.67 points, the magnitude was significantly lower. This indicates both models were effective, but the blended learning model had a stronger promoting effect.

Second, significant between-group difference:

An independent samples t-test showed the experimental group's score difference (post-test - pre-test) was significantly higher than that of the control group (mean difference = 3.33,  $t = 2.476$ ,  $p = 0.016$ ), with an effect size of Cohen's  $d = 0.64$  (medium effect). According to Cohen's (1988) standards, this difference has perceptible value in practical teaching—the experimental group's improvement in the "Method Selection and Application" dimension (corresponding to core skill goals) reached 8.5 points, contributing 61.2% to the total score difference. This confirms the model's targeting for "achieving skill goals".

Third, significant net effect:

After controlling for pre-test scores via Analysis of Covariance (ANCOVA), the main effect of group remained significant ( $F = 6.637$ ,  $p = 0.013$ , partial  $\eta^2 = 0.104$ ).

This indicates the advantage of blended learning was independent of initial academic level, eliminating the interference of "baseline differences" and making the conclusion more reliable.

In terms of result attribution, the experimental group's outstanding performance stemmed from three factors:

The localized design of WebQuest tasks (e.g., recruitment assessment for local technology companies) improved the initiative of resource utilization;

"Role-differentiated collaboration" (e.g., recruiter-assessor-critic) solved the problem of superficial interaction;

The stratified resource push of Weizhujiao made up for individual competence differences.

This fully aligns with the conclusion from Means et al.'s (2010) meta-analysis that "blended learning must combine independent inquiry and collaborative support".

## Discussion

### Dialogue with Existing Literature

The results of this study form a dual relationship of "consistent response" and "innovative supplement" with existing research in the fields of blended learning, OBE, and WebQuest, further consolidating the study's academic foundation.

In terms of blended learning current situation, the problems identified in this study—such as "passive resource use" and "insufficient interaction"—echo Garrison et al.'s (2010) view that "blended learning must balance cognitive presence and social presence". When platforms lack interaction design and resources are disconnected from tasks, students tend to fall into "no in-depth participation".

Meanwhile, this study is the first to focus on "management majors in local undergraduate universities", supplementing the gap in existing research that mostly concentrates on key universities or technical majors. For example, although Tan (2021) pointed out that blended learning can improve autonomous capabilities, it did not address the particularities of local university students (e.g., weak resource

integration and poor time management). The current situation analysis of this study just fills this gap.

In terms of model development, the integration of OBE and WebQuest is not a simple combination:

OBE's "reverse design" sets clear outcome orientation for WebQuest tasks (e.g., "designing assessment schemes"), avoiding the "vague inquiry goals" that WebQuest tends to have (Dodge, 2001);

WebQuest's "scenario tasks" provide a practical carrier for OBE's "outcome implementation", solving the limitation of OBE in practice of "emphasizing goals over processes" (Spady, 1994).

This integration model aligns with González-Gómez et al.'s (2016) view that "blended learning requires the trinity of theory-method-technology". However, this study further incorporates "localized cases" and "platform function adaptation", making it more practically targeted than previous research—for example, embedding cases of local enterprises in Pingdingshan solves the problem of "disconnection between scenarios and students' lives" in González-Gómez's research.

In terms of model effectiveness, the significant score improvement of the experimental group aligns with the meta-analysis conclusion of Means et al. (2010) on 114 blended learning studies (average effect size of blended learning = 0.58). The effect size of this study ( $d = 0.64$ ) is slightly higher than the average, indicating that the integration of OBE-WebQuest is more effective than general blended learning.

Meanwhile, this study used ANCOVA and repeated measures ANOVA (Time × Group interaction effect,  $p = 0.016$ ) to control for confounding variables more strictly than Means et al.'s research, making the conclusion more credible. Additionally, this study found that "improvement in the skill dimension was most significant", which echoes Yang's (2024) result that "OBE focuses on skill achievement" in the Machine Learning course. However, this study further verified the applicability of this conclusion in management-related courses.

### Theoretical Contributions of the Study

Although this study takes local undergraduate universities as samples, it still has three theoretical contributions in the fields of blended learning theory and OBE-WebQuest integration.

First, improving the "problem-solution" theoretical chain of blended learning. Most existing studies focus on "describing the advantages" of blended learning (e.g., Baker & Jeffries, 2019 emphasized flexibility), but lack systematic solutions to "how to implement it in local universities". This study identified three pain points through Objective 1 ("passive resources, insufficient interaction, large individual differences"), developed a model with "pre-diagnosis-stratified resources-role collaboration" through Objective 2 to address these pain points, and verified the effect through Objective 3. It forms a closed loop of "current situation diagnosis → model development → effect verification", providing a "problem-oriented" practical paradigm for blended learning theory.

Then expanding the integrated theoretical framework of OBE and WebQuest. Existing studies mostly discuss OBE or WebQuest separately: OBE research focuses on curriculum goal design (Jiang, 2003), while WebQuest research focuses on task development (Wang, 2005). There are few studies on their integration. This study proposes an integration logic of "OBE defines goals, WebQuest designs tasks, platform provides support", clarifying the functional boundaries and linkage mechanisms of each element—for example, OBE defines "skill goals", WebQuest designs "assessment scheme tasks", and Weizhujiao provides "stratified resources and interactive tools". This framework provides a reusable theoretical template for subsequent similar studies.

Enriching the theoretical perspective of educational technology adaptation. This study does not simply rely on technology, but emphasizes that "technology serves goals"—for example, the "Daily Quick Answer" function of Weizhujiao is used for collaborative learning, and Wenjuanxing is used for personalized task push, all centered on the goals of "improving participation and adapting to individual differences". This aligns with the view in Davis' (1989) Technology Acceptance Model

that "perceived usefulness takes precedence over ease of use". However, this study further proposes that "technology adaptation must combine disciplinary characteristics" (e.g., management majors need enterprise case resource libraries), making it more discipline-specific than general technology acceptance research.

## Recommendations

Based on the research results, this study puts forward practical implications from three perspectives—higher education institutions, management course teachers, and learning platform developers—to ensure the research results are implementable and promotable.

### Implications for Higher Education Institutions

#### Improve infrastructure and resource construction

To address the problems of "unstable platforms and insufficient resources" identified in the current situation survey, it is recommended that universities increase investment:

Upgrade campus networks and Weizhujiao Platform functions to ensure "stratified task push" and "cross-platform data interoperability" (e.g., connecting Weizhujiao with Wenjuanxing);

Collaborate with local enterprises (e.g., Pingmei Group, Pang Donglai) to build a "management case resource library" containing real assessment schemes and tax data, solving the pain point of "lack of high-quality resources" (Teacher T9 mentioned the lack of real data for tax training).

#### Promote teacher training and curriculum reform

Incorporate the OBE-WebQuest blended learning model into teacher training systems, focusing on training "localized case design" (e.g., how to transform local enterprise needs into WebQuest tasks) and "platform data application" (e.g., analyzing student task completion rates through Weizhujiao);

Meanwhile, clarify blended learning requirements in the syllabi of management courses—for example, Personnel Quality Assessment must include

"real enterprise tasks" and "three-dimensional evaluation"—to avoid the "emphasizing theory over practice" in traditional teaching.

### **Implications for Management Course Teachers**

Optimize teaching strategy design:

Adopt a "case-task" dual-drive approach. For example, in the "interview type selection" module, use "recruitment of e-commerce enterprises in Pingdingshan" as a case to design WebQuest tasks (matching positions with interview types), improving students' application capabilities;

Implement "differentiated support": divide students into "basic groups" (pushing basic tool manuals) and "advanced groups" (pushing industry reports) through Weizhujiao pre-diagnosis to make up for individual differences.

Strengthen process-oriented evaluation:

Use Weizhujiao to implement three-dimensional evaluation of "automatic scoring + peer review + teacher evaluation"—for example, objective questions are automatically scored by the platform, group schemes are blindly reviewed by peers, and final assessment schemes are scored by teachers combined with opinions from enterprise mentors. This not only reduces teachers' workload but also improves the comprehensiveness of evaluation, solving the problem of "single evaluation" in the current situation.

### **Implications for Learning Platform Developers**

Enhance function adaptability

To address teachers' feedback that "the platform lacks personalized push", it is recommended to add a "competence label" function to Weizhujiao—automatically labeling students with "weak resource integration" or "poor time management" based on pre-diagnosis results, and pushing corresponding tasks and resources;

Meanwhile, develop a "semi-automatic marking module for subjective questions" (e.g., automatically detecting whether an assessment scheme includes elements such as "tool selection" and "process design") to reduce teachers' workload.

Improve mobile learning experience

Given that 50.9% of students use mobile phones for learning, optimize the platform's mobile interface—for example, simplifying the "task submission" process and supporting "fragmented resource browsing" (e.g., breaking cases into 5-10 minute short videos)—to meet students' needs for "learning anytime, anywhere".

### **Research Limitations**

Although this study ensures scientificity through multi-stage design, it still has three limitations that need to be improved in subsequent research:

#### **Sample and scenario limitations**

The research sample was only from the School of Economics and Management at Pingdingshan University (173 students, 10 teachers), and the experiment was only conducted in the Personnel Quality Assessment course, limiting the generalizability of the conclusions. For example, students in key universities have stronger autonomous capabilities and may not need "time management reminders"; non-management courses (e.g., science and engineering) have different needs for WebQuest tasks, requiring model adjustments. Future research should expand samples to different types of universities and majors to verify the model's universality.

#### **Intervention duration and effect dimension limitations**

The experimental intervention only lasted 4 months (February-June 2025), with no tracking of long-term effects (e.g., students' post-graduation on-the-job application capabilities); effect evaluation mainly relied on "test scores", lacking qualitative evidence (e.g., feedback from students' internships). Subsequent research can extend the intervention to 1-2 academic years and combine multi-dimensional data such as "internship performance" and "employer evaluation" to comprehensively measure the model's effect.

#### **Platform dependence limitations**

Model development and experiments relied on the Weizhujiao Platform, with no verification of its adaptability to other platforms (e.g., Xuexitong, Chaoxing Fanya). Some local universities may use regional platforms (e.g., the "Henan

Provincial Higher Education Online Open Course Platform" commonly used by universities in Henan Province), so the platform transferability of the model needs further testing.

### **Future Researches**

To address the above limitations, future research can be carried out from three aspects:

#### **Cross-scenario and cross-disciplinary verification**

Test the model in different types of universities (e.g., higher vocational colleges, key universities) and disciplines (e.g., marketing, accounting), analyzing the moderating effects of "university level" and "disciplinary characteristics" on the model's effect. For example, higher vocational college students may need "more practical WebQuest tasks", while key university students may need "more challenging tasks".

#### **Long-term effect and multi-dimensional evaluation**

Conduct longitudinal studies to track students for 1-2 years, collecting data such as "knowledge retention rate" and "on-the-job skill application";

Meanwhile, introduce qualitative materials such as "student reflection journals" and "teacher interview feedback" to form a mixed evaluation system of "quantitative + qualitative", more comprehensively verifying the model's value.

#### **Technology integration and model upgrading**

Explore the integration of emerging technologies with the model, such as introducing AI chatbots (for real-time answers to WebQuest task questions) and VR (for simulating recruitment assessment scenarios) to enhance the inquiry experience;

Meanwhile, develop a "model-platform adaptation guide" for platform adaptability issues, clarifying the function debugging methods for different platforms (Weizhujiao, Xuexitong) to promote the widespread application of the model.

In summary, through systematic research on "current situation\model effect", this study confirms the effectiveness of the OBE-WebQuest blended learning model in management majors of local undergraduate universities. Despite limitations, the research results still provide theoretical references and practical paths for

blended learning teaching reform. In the future, only by adjusting the model details according to specific scenarios can its value in improving students' knowledge, skills, and literacy be fully exerted.

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## Appendices

## Appendix A

List of Specialists and Letters of Specialists Invitation  
for IOC Verification

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Name of Experts	Position/Office
Associate Professor Yan Han	Director of the Big Data Management and Application Teaching and Research Office
Associate Professor Yan Lei	Head of Financial Engineering
Professor Yang Yujing	Head of Scientific Research of the School of Economics and Management
Professor He Jie	Head of Teaching of the School of Economics and Management
Associate Professor Li Ning	Director of the Teaching Evaluation Office

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Appendix B

Official Letter



Ref.No. MHESI 0643.14/ ๓๒๔

Bansomdejchaopraya Rajabhat University  
1061 Itsaraparb Hirunrujee  
Thonburi Bangkok 10600

30 October 2025

RE: Invitation to validate research instrument

Dear Associate Professor Yan Han

Mrs.Zhang Qianhui is a graduate student in Doctor of Philosophy Program in Digital Technology Management for Education of Bansomdejchaopraya Rajabhat University. She is undertaking research entitle "Development of blended learning model(BLM) for undergraduate Students Majoring in Management Learning Effectiveness in Pingdingshan university"

The thesis adversity committee has considered that you are an expert in this topic. Your recommendations would be useful for further improvement of this research instrument.

With your expertise, we would like to ask your permission to validate the attached research instrument. In this regard, We would like to avail ourselves of this opportunity to express our sincere thanks and appreciation for your help.

Yours faithfully,

Assistant Professor Dr.Thanaput Chanchaoren  
(Vice Dean of Graduate School for Dean of Graduate School)

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Ref.No. MHESI 0643.14/ ๓๓๓

Bansomdejchaopraya Rajabhat University  
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30 October 2025

RE: Invitation to validate research instrument

Dear Associate Professor Yan Lei

Mrs.Zhang Qianhui is a graduate student in Doctor of Philosophy Program in Digital Technology Management for Education of Bansomdejchaopraya Rajabhat University. She is undertaking research entitle "Development of blended learning model(BLM) for undergraduate Students Majoring in Management Learning Effectiveness in Pingdingshan university"

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Yours faithfully,

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Bansomdejchaopraya Rajabhat University  
1061 Itsaraparb Hirunrujee  
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30 October 2025

RE: Invitation to validate research instrument

Dear Professor Yang Yujing

Mrs.Zhang Qianhui is a graduate student in Doctor of Philosophy Program in Digital Technology Management for Education of Bansomdejchaopraya Rajabhat University. She is undertaking research entitle "Development of blended learning model(BLM) for undergraduate Students Majoring in Management Learning Effectiveness in Pingdingshan university"

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Ref.No. MHESI 0643.14/ 321

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30 October 2025

RE: Invitation to validate research instrument

Dear Professor He Jie

Mrs.Zhang Qianhui is a graduate student in Doctor of Philosophy Program in Digital Technology Management for Education of Bansomdejchaopraya Rajabhat University. She is undertaking research entitle "Development of blended learning model(BLM) for undergraduate Students Majoring in Management Learning Effectiveness in Pingdingshan university"

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Yours faithfully,

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Ref.No. MHESI 0643.14/ 320

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30 October 2025

RE: Invitation to validate research instrument

Dear Associate Professor Li Ning

Mrs.Zhang Qianhui is a graduate student in Doctor of Philosophy Program in Digital Technology Management for Education of Bansomdejchaopraya Rajabhat University. She is undertaking research entitle "Development of blended learning model(BLM) for undergraduate Students Majoring in Management Learning Effectiveness in Pingdingshan university"

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Appendix C  
Research Instrument

Appendix C1: Questionnaire on the Current Situation and Learning Effects of the Blended Learning Model for Undergraduate Students (Objective 1)

Appendix C2: Teacher Interview Outline for the Study on Blended Learning Models at Pingdingshan University (Objective 1)

Appendix C3: Questionnaire for Experts-Assessment Form for IOC Validity of the Questionnaire on the Current Situation and Learning Effects of the Blended Learning Model for Undergraduate Students (Objective 1)

Appendix C4: Questionnaire for Experts-Assessment Form for IOC Validity of Blended Learning Model for Undergraduate Students Majoring in Management at Pingdingshan University (Objective 2)

Appendix C5: Learning Schedule of Experimental Group (Objective 3)

Appendix C6: Learning Schedule of Control Group (Objective 3)

Appendix C7: Test Paper (Objective 3)

1. Test Paper-Pro-Test

2. Test Paper-Post-Test

Appendix C8: Questionnaire for experts-Assessment Form for IOC Scoring Form for the Test "Operational Process of Personnel Quality (Objective 3)

## Appendix C1

### Questionnaire on the Current Situation and Learning Effects of the Blended Learning Model for Undergraduate Students

Dear Participants,

Thank you very much for taking the time to complete this questionnaire. To understand the implementation status and learning effects of the blended learning model for undergraduate students at Pingdingshan University, this questionnaire is designed. It is anonymous, and all data will be used for academic research only. Please answer based on your real experience. Completing the questionnaire will take approximately 8-10 minutes. Thank you for your support!

#### Part 1. Basic Information

1. Your junior:

Freshman  Sophomore  Junior

2. Your major:

Management  Others (please specify: \_\_\_\_\_)

3. Your gender:

Male  Female

4. Which electronic device(s) do you use for online learning?

Mobile phone  Tablet  Laptop  Desktop computer  Library electronic devices

5. Daily duration of using electronic devices (for online learning):

Less than 30 minutes  30 minutes - 1 hour  1 - 2 hours  2 - 3 hours  More than 3 hours

6. Number of days you independently arrange blended learning per week:

Less than 2 days  2 - 3 days  3 - 4 days  4 - 5 days  Every day

7. Your network environment:

Campus network  Home broadband  Mobile data  Public WiFi (e.g., library)  Others (please specify: \_\_\_\_\_)

Note: For data analysis, the 5 options for Questions 4-7 need to be coded, with the first option coded as 1 and the last as 5.

## Part 2. Current Situation of Blended Learning

Please select the option that best matches your actual situation (1-5 points):

(1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

Item	Description	1	2	3	4	5
8	Utilize various resources in blended learning to support my study (e.g., online courses, practice tests).					
9	Frequently participate in online learning activities (e.g., watching videos, taking online tests).					
10	Have a high overall satisfaction with the current blended learning model.					
11	In blended learning, interact frequently with teachers and classmates.					
12	Blended learning helps master course knowledge better.					

### Part 3. Influencing Factors of Learning Effects

Please select the option that best matches your actual situation (1-5 points):

(1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

#### (A) Student Individual Factors

Item	Description	1	2	3	4	5
13	Have clear learning goals and strong learning motivation.					
14	Hold a positive attitude towards blended learning and willing to participate proactively.					
15	Can independently arrange online learning time.					
16	Can effectively integrate online resources with offline class content for review.					

#### (B) Learning Behavior Factors

Item	Description	1	2	3	4	5
17	Actively participate in discussions and interactions in online or offline classes.					
18	Regularly summarize and reflect on what have learned to adjust learning methods.					
19	Can complete online/offline assignments or tasks assigned by teachers on time.					
20	When encountering learning difficulties, take the initiative to find solutions (e.g., consulting materials, asking others for help).					
21	Invest sufficient independent learning time in blended learning-related content every week.					
22	Real-time feedback during learning (e.g., answers to in-class quizzes, question explanations) helps understand knowledge points better.					

## (C) Learning Environment and Resources

Item	Description	1	2	3	4	5
23	The operation guidelines for online learning platforms are clear and easy to understand (e.g., login, assignment submission process).					
24	The teaching materials, reference books, etc., provided in blended learning are abundant and practical.					
25	Online learning platforms are easy to operate and well support learning.					
26	Can easily access learning resources such as teaching materials, exercises, and reference books.					

## Appendix C2

### Teacher Interview Outline for the Study on Blended Learning Models at Pingdingshan University

(Corresponding to the Study Development and Effectiveness Evaluation of Blended Learning Models for Undergraduates Majoring in Management at Pingdingshan University)

#### Part 1. Basic Interview Information

Item	Content to Fill In
Interview No.	TE-2024-00____(numbered in the order of interviews)
Interview Subject	teachers from the School of Economics and Management, Pingdingshan University (anonymous codes: T1-T10)
Interview Time	
Interview Venue	<input type="checkbox"/> Offline: Room _____, Building _____, Pingdingshan University <input type="checkbox"/> Online: Tencent Meeting (Meeting ID: _____)
Interview Duration	_____ minutes (estimated 30-40 minutes)

#### Part 2. Interview Objectives

This interview focuses on the blended learning model for the Management major at Pingdingshan University. The core objectives include: To verify the current implementation status of blended learning and supplement details of teaching practice; To explore practical problems faced by teachers in blended learning; To collect optimization suggestions for the Blended Learning Model".

### Part 3. Interview Ethical Statement

Dear Teacher,

Thank you for participating in this interview. The data from this interview will be used for academic research only, without involving commercial use. Your personal information will be handled anonymously, and the interview can be terminated at any time without you assuming any responsibility. Thank you again for your support and cooperation!

### Part 4. Core Interview Outline

Note: This outline includes 5 core modules with a total of 10 questions. During the interview, flexible follow-up questions can be conducted based on the answers To ensure in-depth exploration of key information.

Module 1: Basic Background (2 Questions)

Have you participated in blended learning-related training or curriculum reform projects? What online teaching platforms and their core functions do you mainly use?

Regarding your blended learning teaching capabilities (e.g., platform operation, task design), what skills do you think are most in need of improvement?

Module 2: Implementation Status (2 Questions)

What teaching strategies do you commonly use in blended learning? Please give an example with a specific course to illustrate how online and offline teaching are connected.

What core indicators do you use to evaluate students' blended learning effects? How do these indicators reflect the advantages of blended learning?

Module 3: Student Performance (2 Questions)

What typical problems have you observed in students' participation in blended learning (e.g., in terms of resource utilization, interactive participation)?

Are there differences in performance between students of different juniors or foundations in blended learning? Please give an example to illustrate.

Module 4: Practical Difficulties (2 Questions)

What are the biggest difficulties you have encountered when conducting blended learning (e.g., in terms of platforms, resources, workload)?

Can the blended learning support provided by the university (e.g., technology, resources, training) meet your needs? Which links have deficiencies?

Module 5: Model Suggestions (2 Questions)

Are you familiar with "Outcome-Based Education (OBE)"? Have you tried to design teaching links around "expected learning outcomes" in your teaching?

If OBE and WebQuest (real-situation inquiry tasks) are integrated into a blended learning model, what key links do you think need to be focused on? What optimization suggestions do you have?

V. Post-Interview Instructions

Interview Conclusion: "Thank you very much for your sharing! Do you have any other important ideas or suggestions regarding blended learning?"

Interview Record Confirmation: "The interview records will be organized within 10 working days. Please let us know if you need to review them."

## Appendix C3

### Assessment Form for IOC Validity of the Questionnaire on the Current Situation and Learning Effects of the Blended Learning Model for Undergraduate Students

**Research Title:** Development of blended learning model for undergraduate Students Majoring in Management Learning Effectiveness in Pingdingshan university.

**Research Objectives:** 1. To investigate the current situation of blended learning (e.g., device use, resource utilization, interaction) among undergraduate students majoring in Management at Pingdingshan University; 2. To identify the influencing factors of blended learning effects (including student individual factors, learning behavior factors, and learning environment & resource factors) for the above students.

Assessor: \_\_\_\_\_

Position: \_\_\_\_\_

Workplace: \_\_\_\_\_

**Directions:** Please assess the congruence between each questionnaire item and the research objectives by ticking "v" in the corresponding box according to the following criteria:

- +1: If you think the item CAN accurately measure the corresponding content of the research objectives
- 0: If you are NOT SURE whether the item can measure the corresponding content of the research objectives
- 1: If you think the item CANNOT measure the corresponding content of the research objectives

Items	Contents	Results			Remarks
		Assessment			
		+1	0	-1	
Part 1 Relevant Information of the Respondent (Student Basic Information)	Used to describe the sample characteristics of surveyed students, providing a basis for analyzing blended learning differences across groups (e.g., juniors, majors)				
Q1	Your junior: <input type="checkbox"/> Freshman <input type="checkbox"/> Sophomore <input type="checkbox"/> Junior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q2	Your major: <input type="checkbox"/> Management <input type="checkbox"/> Others (please specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q3	Your gender: <input type="checkbox"/> Male <input type="checkbox"/> Female	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q4	Which electronic device(s) do you use for online learning? <input type="checkbox"/> Mobile phone <input type="checkbox"/> Tablet <input type="checkbox"/> Laptop <input type="checkbox"/> Desktop computer <input type="checkbox"/> Library electronic devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q5	Daily duration of using electronic devices (for online learning): <input type="checkbox"/> Less than 30 minutes <input type="checkbox"/> 30 minutes - 1 hour <input type="checkbox"/> 1 - 2 hours <input type="checkbox"/> 2 - 3 hours <input type="checkbox"/> More than 3 hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q6	Number of days you independently arrange blended learning per week: <input type="checkbox"/> Less than 2 days <input type="checkbox"/> 2 - 3 days <input type="checkbox"/> 3 - 4 days <input type="checkbox"/> 4 - 5 days <input type="checkbox"/> Every day	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Items	Contents	Results			Remarks
		Assessment	+1	0	
Q7	Your network environment: <input type="checkbox"/> Campus network <input type="checkbox"/> Home broadband <input type="checkbox"/> Mobile data <input type="checkbox"/> Public WiFi (e.g., library) <input type="checkbox"/> Others (please specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Part 2 Current Situation of Blended Learning for Undergraduate Students Majoring in Management</b>	Used to measure the actual implementation status of blended learning for the surveyed students, corresponding to Research Objective 1				
Q8	Utilize various resources in blended learning to support study (e.g., online courses, practice tests).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q9	Frequently participate in online learning activities (e.g., watching videos, taking online tests).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q10	Have a high overall satisfaction with the current blended learning model.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q11	In blended learning, interact frequently with teachers and classmates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q12	Blended learning helps master course knowledge better.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Items	Contents	Results			Remarks
		Assessment	+1	0	
Part 3 Influencing Factors of Blended Learning Effects for Undergraduate Students Majoring in Management	Used to identify factors affecting blended learning effects, corresponding to Research Objective 2				
(A) Student Individual Factors					
Q13	Have clear learning goals and strong learning motivation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q14	Hold a positive attitude towards blended learning and willing to participate proactively.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q15	Can independently arrange online learning time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q16	Can effectively integrate online resources with offline class content for review.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(B) Learning Behavior Factors					
Q17	Actively participate in discussions and interactions in online or offline classes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q18	Regularly summarize and reflect on what I have learned to adjust learning methods.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Items	Contents	Results			Remarks
		Assessment			
		+1	0	-1	
Q19	Can complete online/offline assignments or tasks assigned by teachers on time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q20	When encountering learning difficulties, take the initiative to find solutions (e.g., consulting materials, asking others for help).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q21	Invest sufficient independent learning time in blended learning-related content every week.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q22	Real-time feedback during learning (e.g., answers to in-class quizzes, question explanations) helps understand knowledge points better.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(C) Learning Environment and Resources					
Q23	The operation guidelines for online learning platforms are clear and easy to understand (e.g., login, assignment submission process).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q24	The teaching materials, reference books, etc., provided in blended learning are abundant and practical.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Q25	Online learning platforms are easy to	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Items	Contents	Results			Remarks
		Assessment			
		+1	0	-1	
	operate and well support learning.				
Q26	Can easily access learning resources such as teaching materials, exercises, and reference books.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

## Appendix C4

### Assessment Form for IOC Validity of Blended Learning Model for Undergraduate Students Majoring in Management at Pingdingshan University

**Research Title:** Development of blended learning model for undergraduate Students Majoring in Management Learning Effectiveness in Pingdingshan university.

**Research Objectives:** 2. To develop a blended learning model integrating Outcome-Based Education (OBE) and WebQuest for undergraduate students majoring in Management at Pingdingshan University.

Assessor: \_\_\_\_\_

Position: \_\_\_\_\_

Workplace: \_\_\_\_\_

**Directions:** Please assess the congruence between the model's evaluation items and the research objective by putting "√" in the corresponding box according to the following criteria:

- +1: If you think the item CAN measure the core content of the research objective
- 0: If you are NOT SURE whether the item can measure the core content of the research objective
- 1: If you think the item CANNOT measure the core content of the research objective

Items	Contents	Results			Remarks
		Assessment	+1	0	
<b>Section 1</b>	Basic Information of Experts				
No. 1	Your identity <input type="checkbox"/> Enterprise HR (Management Field) <input type="checkbox"/> <input type="checkbox"/> University Teacher (Management Education) <input type="checkbox"/> <input type="checkbox"/> Educational Technology Expert <input type="checkbox"/> Vocational <input type="checkbox"/> Education Expert <input type="checkbox"/> Teaching Management <input type="checkbox"/> Personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 2	Your professional title <input type="checkbox"/> Primary Title <input type="checkbox"/> Middle <input type="checkbox"/> Title <input type="checkbox"/> Vice-senior Title <input type="checkbox"/> Senior Title	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 3	Your age <input type="checkbox"/> Less than 30 <input type="checkbox"/> 30-40 <input type="checkbox"/> 40-50 <input type="checkbox"/> Over 50 years old	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Section 2</b>	Evaluation Form for OBE-WebQuest Blended Learning Model				
<b>Part 1</b>	Step 1: Clarifying Learning Outcomes				
No. 1	1.1 Quantifiable Objectives (Define measurable learning outcomes such as "knowledge mastery" and "skill enhancement")	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 2	1.2 Sound Platform Release Mechanism (Release learning outcomes via Micro-Teaching Assistant platform)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 3	1.3 Clear Evaluation Criteria (Formulate scoring standards for learning outcomes)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Items	Contents	Results			Remarks
		Assessment			
		+1	0	-1	
<b>Part 2</b>	Step 2: Reverse Curriculum Design				
No. 4	2.1 Connection Between Module Goals and Overall Outcomes (Align each course module with final learning outcomes)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 5	2.2 Rational Logic of Reverse Design for Teaching Activities (Design offline/online activities backward from outcomes)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 6	2.3 Alignment of Evaluation Methods with Goals (Match assessment methods to outcome types, e.g., tests for knowledge, projects for skills)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Part 3</b>	Step 3: Designing WebQuest Tasks				
No. 7	3.1 Effectiveness of Task Scenario Introduction (Design localized scenarios such as "Pingdingshan enterprise recruitment assessment")	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 8	3.2 Resource Organization Supporting the Inquiry Process (Classify resources into basic/advanced/challenging to support WebQuest inquiry)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 9	3.3 Diverse Evaluation Covering WebQuest Components (Integrate self/peer/teacher evaluation for WebQuest tasks)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Part 4</b>	Step 4: Organizing Collaborative Learning				

Items	Contents	Results			Remarks
		Assessment	+1	0	
No. 10	4.1 Group Task Design Promoting Collaboration (Assign role-differentiated tasks such as "researcher/presenter/questioner")	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 11	4.2 Quick Answer Question Bank Enhancing Participation (Use Micro-Teaching Assistant's "Daily Quick Answer" to boost group interaction)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 12	4.3 Timeliness of Teacher Feedback Mechanism (Teachers provide feedback on group tasks within 24 hours via the platform)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Part 5</b>	Step 5: Addressing Individual Differences				
No. 13	5.1 Diverse Resources Meeting Different Learning Styles (Provide text/video/audio resources for visual/auditory learners)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 14	5.2 Mechanism for Personalized Task Selection (Allow students to choose tasks based on pre-test results)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 15	5.3 Quick Answer Function Testing Knowledge Mastery (Use platform quizzes to identify students' knowledge gaps)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Part 6</b>	Step 6: Evaluation and Improvement				
No. 16	6.1 Combination of Formative and Summative Evaluation (Track process via platform data +	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Items	Contents	Results			Remarks
		Assessment			
		+1	0	-1	
	assess outcomes via post-tests)				
No. 17	6.2 Learning Data Analysis Driving Optimization (Analyze student engagement/score data to adjust the model)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 18	6.3 Clear Dynamic Adjustment Mechanism (Revise tasks/resources quarterly based on expert/student feedback)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

## Appendix C5

### Learning Schedule of Experimental Group

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
1	<p>Introduction: How to Avoid "Interview Experts" in Assessment?</p> <p>Goal: Understand the value of assessment and common misunderstandings</p>	<p>1. Pre-ability Diagnosis: Complete 20 basic questions (covering assessment concepts and core processes) via the "Quiz" module of Micro-Teaching Assistant</p> <p>2. Learning Path Selection: Submit applications for basic/advanced/challenge levels via the "Learning Goals" module of Micro-Teaching Assistant, and explain the reasons for selection</p>	2 (2+0)	Path Selection Report (Teacher's One-on-One Feedback: alignment between learning needs and path, clarity of goal expression)
2	<p>Module 1: Reliability and Validity Analysis of Assessment Tools</p> <p>Goal: Master the core basis for selecting assessment tools</p>	<p>1. Task: Analyze 3 recruitment failure cases (e.g., "misuse of psychological tests for technical positions"), and submit vulnerability analysis reports (including tool adaptation issues and reliability/validity defects) via the "Assignment" module of Micro-Teaching Assistant</p> <p>2. Resources: Tiered delivery of tool manuals via the "Resource Center" of Micro-Teaching Assistant (Basic Version: definitions of reliability and validity; Advanced Version:</p>	2 (2+0)	Corrected Question Bank (20 questions, auto-junior by Micro-Teaching Assistant + teacher's secondary annotation: judgment of tool application scenarios, interpretation of reliability/validity indicators, attribution of vulnerabilities)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
		vulnerability analysis templates)		
3	New Module: Basics and Practice of Resume Screening Goal: Master key dimensions and practical methods of resume screening	1. Task 1: Disassemble core elements of "excellent sales resumes" (performance data, skill alignment) and share results in the "Discussion Area" of Micro-Teaching Assistant 2. Task 2: Screen 10 real resumes (including 2 exaggerated resumes) and submit screening results + exclusion reasons via the "Assignment" module of Micro-Teaching Assistant 3. Resources: Download industry resume templates and resume screening rating sheets via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	1. Resume Element Disassembly Report (Assessment: accuracy of dimension extraction, alignment with job requirements) 2. Screening Results (Teacher's Random Review: consistency of screening criteria, logic of exclusion reasons)
4	New Module: Selection and Adaptation of Interview Types Goal: Match appropriate interview types based on job requirements	1. Task: Match interview types (e.g., structured, semi-structured, stress interviews) for "e-commerce operation positions", "administrative positions", and "technical R&D positions", and submit matching plans + bases (including job characteristics, advantages and disadvantages of interview types) via the "Assignment" module of Micro-Teaching Assistant 2. Resources: Deliver 12 types of interview manuals and job	2 (1+1)	Matching Plan (Peer Review + Teacher Verification: adaptability between positions and interview types, persuasiveness of bases)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
		JD case libraries via the "Resource Center" of Micro-Teaching Assistant		
5	Module 3: Practice of Traditional Assessment Tools (1) - Structured Interview Design Goal: Independently compile structured interview questions for a single position	1. Task: Compile 5 structured interview questions for "customer service positions" (including 3 situational questions and 2 behavioral questions), and submit questions + scoring criteria via the "Assignment" module of Micro-Teaching Assistant 2. Resources: Access Tencent/Huawei structured interview question banks (Advanced Version) and question compilation templates via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Interview Questions and Scoring Criteria (AI Plagiarism Check + Teacher's Professional Feedback: alignment between questions and position competencies, operability of scoring criteria)
6	Module 3: Practice of Traditional Assessment Tools (2) - Basics of Leaderless Group Discussion Goal: Understand the core process and role	1. Task 1: Watch videos of "FMCG enterprise campus recruitment leaderless group discussions", and analyze 3 key links (question review, free discussion, summary) in the "Discussion Area" of Micro-Teaching Assistant 2. Task 2: Simulate grouping via the "Group Management" module of Micro-Teaching Assistant, and confirm roles (leader/timer/recorder/summarizer)	2 (1+1)	Link Analysis Report (Peer Review: accuracy of process disassembly, clarity of role responsibility cognition)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
	division of leaderless group discussion			
7	Module 3: Practice of Traditional Assessment Tools (3) - Design of Leaderless Group Discussion Goal: Design a complete leaderless group discussion task and rating sheet	1. Task: Design a leaderless group discussion task for "marketing positions" (e.g., "new product promotion plan development"), and submit task instructions + rating sheets via the "Assignment" module of Micro-Teaching Assistant 2. Resources: Deliver task cases and reference scoring dimensions via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Design Plan (Teacher Scoring + Enterprise HR Video Feedback: authenticity of task scenarios, comprehensiveness of scoring dimensions)
8	Module 2: Design of Position-Competency Matching Model Goal: Independently construct a competency assessment framework for a single position	1. Task: Design a core competency assessment framework for "short video operation positions" (including 4-6 key competencies, such as content creativity and data sensitivity) 2. Grouping: Fix roles via the "Group Management" module of Micro-Teaching Assistant (recruiter: demand analysis; assessor: competency disassembly; candidate: perspective	2 (1+1)	Blind Review of Group Plans (Peer Review: completeness of the framework, adaptability between competencies and positions; Teacher Feedback: operability improvement suggestions)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
		verification) 3. Resources: Deliver position competency cases via the "Resource Center" of Micro-Teaching Assistant		
9	Module 4: Application of Assessment Center Technology (1) - Basics of In-Basket Test Goal: Understand the application scenarios and key assessment points of in-basket tests	1. Task: Analyze the case of "in-basket test for department manager positions", and submit 3 core assessment dimensions (e.g., decision-making ability, priority judgment) via the "Assignment" module of Micro-Teaching Assistant 2. Resources: Download in-basket test case sets and assessment dimension descriptions via the "Resource Center" of Micro-Teaching Assistant	2 (2+0)	Case Analysis Report (Teacher's Batch Feedback + Typical Case Sharing: accuracy of dimension extraction, alignment with position levels)
10	Module 4: Application of Assessment Center Technology (2) - Practice of In-Basket Test Goal: Master the basic processing logic of in-basket tests	1. Task: Simulate completing an in-basket test for "HR specialist positions" (including 5 tasks: employee complaint handling, recruitment plan adjustment, etc.), and submit processing plans via the "Assignment" module of Micro-Teaching Assistant 2. Resources: Deliver in-basket test task lists and processing idea templates via the "Resource Center" of Micro-Teaching	2 (0+2)	Processing Plans (Teacher's Individual Scoring: rationality of decisions, accuracy of task priority ranking, clarity of written expression)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
		Assistant		
11	Module 5: Assessment Data Analysis and Reporting (1) - Basic Analysis (No Prior SPSS Knowledge) Goal: Master manual/Excel basic statistical methods for assessment data	1. Task: Calculate "student assessment score data" (including mean, standard deviation, pass rate) using Excel or manually, and submit screenshots of calculation processes + result interpretations via the "Assignment" module of Micro-Teaching Assistant 2. Resources: Deliver Excel statistical operation videos and simulated datasets (including basic data) via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Statistical Results (Feedback via "Assignment Annotation" of Micro-Teaching Assistant: correctness of statistical steps, accuracy of data interpretation)
12	Module 5: Assessment Data Analysis and Reporting (2) - Report Writing Goal: Independently write concise assessment data analysis reports	1. Task: Diagnose "contradictions in candidate assessment data" (e.g., high written test scores but low interview scores), and submit analysis reports (including improvement suggestions) via the "Assignment" module of Micro-Teaching Assistant 2. Resources: Deliver assessment report templates and contradiction analysis cases via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Data Analysis Report (Auto-Grading: completeness of report structure, accuracy of data citation; Teacher Feedback: feasibility of improvement suggestions)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
13	<p>Module 6: Deployment of AI Assessment Tools - Comparison of Human-Machine Assessment Differences</p> <p>Goal: Identify core advantages and disadvantages of AI assessment vs. manual assessment</p>	<p>1. Task: Compare differences between "AI interview systems" and "manual interviews" in 3 dimensions ("efficiency", "fairness", "cost"), and publish comparison tables in the "Discussion Area" of Micro-Teaching Assistant</p> <p>2. Resources: Deliver AI assessment system white papers and human-machine assessment comparison research reports via the "Resource Center" of Micro-Teaching Assistant</p>	2 (2+0)	Difference Comparison Table (Peer Review + Teacher's Supplementary Cases: comprehensiveness of dimension coverage, objectivity of conclusion bases)
14	<p>Module 7: Assessment Ethics and Legal Risks</p> <p>Goal: Avoid discrimination and privacy leakage risks in assessment</p>	<p>1. Task: Address "big data price discrimination"-style assessment disputes (e.g., "adding marriage status assessment questions for female candidates"), and conduct scenario-based mock courts via the "Live Broadcast" module of Micro-Teaching Assistant (roles: plaintiff/defendant/judge)</p> <p>2. Resources: Download assessment ethics and regulatory documents, and dispute case judgments via the "Resource Center" of Micro-Teaching Assistant</p>	2 (1+1)	Ethics Debate (Teacher Scoring: legitimacy of arguments, depth of ethical cognition, fluency of logical expression; Peer Review: sense of role immersion)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
15	Comprehensive Practice: Enterprise Assessment Plan Design (1) - Demand Alignment and Framework Construction Goal: Complete assessment framework design based on real enterprise needs	1. Task: Align with campus recruitment needs of local technology companies, and submit assessment plan frameworks (including assessment links and tool selection) via the "Assignment" module of Micro-Teaching Assistant 2. Resources: Exclusive delivery of enterprise campus recruitment demand documents and plan framework templates via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Plan Framework (Online Feedback from Enterprise Mentors + Teacher Guidance: accuracy of demand understanding, completeness of the framework)
16	Comprehensive Practice: Enterprise Assessment Plan Design (2) - Complete Plan Output Goal: Output implementable enterprise campus recruitment assessment packages	1. Task: Refine the assessment plan (including question banks, rating sheets, process schedules), and submit complete plans via the "Assignment" module of Micro-Teaching Assistant 2. Grouping: Set up plan writing groups/question bank groups/process groups via the "Group Management" module of Micro-Teaching Assistant for collaborative work 3. Resources: Deliver enterprise assessment plan examples via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Three-Dimensional Evaluation: 1. Auto-Scoring (accuracy rate of objective questions) 2. Peer Review (completeness of the plan, degree of group collaboration) 3. Joint Scoring by Teachers + Enterprise Mentors (innovation, practical adaptability)

Week	Theme & OBE Goals	WebQuest Tasks (Micro-Teaching Assistant Platform)	Class Hour Allocation (Lecture + Practice)	Assessment Methods (with Specific Dimensions)
17	Review + Group Discussion Week Goal: Systematically organize course knowledge points and resolve practical doubts	1. Task 1: Group by module (assessment tools/ethics/plan design) in the "Discussion Area" of Micro-Teaching Assistant, and organize core knowledge mind maps 2. Task 2: Conduct Q&A sessions to address doubts in comprehensive practice 3. Resources: Deliver a list of course-wide knowledge points via the "Resource Center" of Micro-Teaching Assistant	2 (1+1)	Mind Maps (Teacher Feedback: comprehensiveness of knowledge point coverage, logical relevance); Q&A Records (Peer Review: pertinence of questions, effectiveness of answers)
18	Test: Comprehensive Competency Assessment Goal: Verify the achievement of three-dimensional goals (knowledge, skills, literacy)	1. Exam: Online test via the "Examination" module of Micro-Teaching Assistant (including 20 multiple-choice questions + 3 case analyses, covering all course modules) 2. Scope: Principles of assessment tools, logic of plan design, ethical decision-making, basic data analysis	2 (0+2)	Exam Scores (Auto-junior by Micro-Teaching Assistant + Teacher's Scoring of Subjective Questions: knowledge memory 30%, skill application 50%, literacy judgment 20%)

## Appendix C6

### Learning Schedule of Control Group

Week	Teaching Content	Class Hour Allocation (Lecture / Practice)	Practical Session	Supporting Goal
1	Chapter 1: Introduction to Personnel Quality Assessment	2 Lecture	-	Knowledge Goal
2	Chapter 2: Fundamentals of Assessment Theory (Iceberg Model)	2 Lecture	-	Knowledge Goal
3	Chapter 3: Operational Process	2 Lecture	-	Knowledge Goal
4	Chapter 4: Construction of Assessment Standard System	2 Lecture	-	Knowledge Goal
5	Chapter 5: Resume Analysis (Theory)	2 Lecture	-	Knowledge Goal
6	Case: Resume Screening	2 Lecture	Case Analysis	Knowledge Goal
7	Practice 1: Resume Design	2 Practice	Design Personal Resumes	Skill Goal
8	Chapter 6: Interview Theory	2 Lecture	-	Knowledge Goal
9	Chapter 6: Structured Interviews	2 Lecture	-	Knowledge Goal
10	Practice 2: Interview Simulation	2 Practice	Watch Interview Videos	Skill Goal
11	Chapter 7: Psychological Test Theory	2 Lecture	-	Knowledge Goal
12	Practice 3: Psychological Self-Assessment	2 Practice	Complete MBTI Test	Literacy Goal
13	Chapter 8: Written Test Assessment	2 Lecture	-	Knowledge Goal

Week	Teaching Content	Class Hour Allocation (Lecture / Practice)	Practical Session	Supporting Goal
14	Chapter 9: Assessment Center Technology (Part 1)	2 Lecture	-	Knowledge Goal
15	Chapter 9: Assessment Center Technology (Part 2)	2 Lecture	-	Knowledge Goal
16	Chapter 10: Quality Analysis	2 Lecture	-	Knowledge Goal
17	Chapter 11: Assessment Result Analysis and Reporting	2 Lecture	-	Knowledge Goal
18	Final Exam	2 Exam	-	Comprehensive Goal

## Appendix C7

### Test Paper

### Pre-Test

Test Questions for "Operational Process of Personnel Quality Assessment"

Total Score: 100 Points | Time Limit: 60 Minutes

Name: \_\_\_\_\_ | Class: \_\_\_\_\_

#### I. Single-Choice Questions (5 Points Each, Total 50 Points)

Among the four alternative answers for each question, select the correct one and fill its serial number in the bracket of the question stem.

(A) Process Knowledge Memory Dimension (7 Questions, 35 Points)

1. In the "objective determination" stage of personnel quality assessment, it is necessary to conduct job demand analysis through multiple methods. Which of the following is the correct sequence of core steps for constructing a job competency model? ( )

A. ②→①→③→④ (② Clarify core job responsibilities and tasks through job analysis; ① Collect behavioral data of high-performing employees using the Behavioral Event Interview (BEI); ③ Extract competency indicators and classify dimensions; ④ Invite experts to verify the consistency of indicators)

B. ①→②→③→④ (① Collect behavioral data of high-performing employees using BEI; ② Clarify core job responsibilities and tasks through job analysis; ③ Extract competency indicators and classify dimensions; ④ Invite experts to verify the consistency of indicators)

C. ②→③→①→④ (② Clarify core job responsibilities and tasks through job analysis; ③ Extract competency indicators and classify dimensions; ① Collect behavioral data of high-performing employees using BEI; ④ Invite experts to verify the consistency of indicators)

D. ①→③→②→④ (① Collect behavioral data of high-performing employees using BEI; ③ Extract competency indicators and classify dimensions; ② Clarify core job responsibilities and tasks through job analysis; ④ Invite experts to verify the consistency of indicators)

2. When designing assessment indicators, scientific methods are required to determine indicator weights. Which of the following methods is an "objective weighting method" and suitable for scenarios with historical assessment data? ( )

A. Analytic Hierarchy Process (AHP) — Construct a judgment matrix based on experts' subjective judgments

B. Entropy Weight Method — Calculate weights based on the dispersion degree of indicator data

C. Delphi Method — Reach a weight consensus through multiple rounds of expert consultation

D. Direct Assignment Method — Assessors directly assign weights based on experience

3. In the quality control of the "implementation stage" of personnel quality assessment, what core attribute of the assessment does "parallel testing" aim to verify? ( )

A. Content Validity — Alignment between assessment content and job requirements

B. Test-Retest Reliability — Consistency of results of the same assessment tool at different times

C. Parallel-Form Reliability — Consistency of results of two equivalent assessment tools

D. Construct Validity — Alignment between assessment results and theoretical framework

4. In the assessment data processing link, if it is necessary to analyze "whether there is a significant difference in assessment scores between the experimental group and the control group" and the data of both groups follow a normal distribution, which statistical method should be used? ( )

A. Independent Samples t-Test — Compare the mean difference between two independent samples

B. Paired Samples t-Test — Compare the mean difference of the same sample in pre-test and post-test

C. Chi-Square Test — Analyze the distribution difference of categorical data

D. Analysis of Variance (ANOVA) — Compare the mean difference of three or more samples

5. The "two-way interaction principle" should be followed in the assessment result feedback stage. Which of the following feedback contents best conforms to this principle? ( )

A. Only inform the candidate that "the total assessment score is 80 points, which is qualified"

B. Explain that "your score in 'teamwork ability' is 75 points (lower than the average of 82 points). Specifically, you spoke less actively in the group discussion. It is recommended to increase participation in group projects later"

C. Only provide a "radar chart of scores in each dimension" without any interpretation

D. Inform that "you failed the assessment, and the specific reason will not be disclosed"

6. Which of the following descriptions of the "assessment implementation process" does NOT conform to the "cost-saving principle"? ( )

A. Assessment for grassroots customer service positions: First screen candidates with "more than 1 year of service experience" through resume analysis, then conduct written tests and situational simulations

B. Assessment for senior management positions: First conduct an assessment center (in-basket test + group discussion), then verify work experience through resume analysis

C. Assessment for technical positions: First eliminate candidates with "inadequate professional knowledge" through written tests, then conduct technical practical operations and structured interviews

D. Assessment for fresh graduates: First conduct an online psychological test for initial screening, then organize offline centralized interviews

7. The selection of assessment tools should match the core tasks of the "implementation stage". Which of the following matches between tools and the implementation stage is incorrect? ( )

A. Preparation stage (preliminary screening) — Resume analysis, online knowledge test

B. Implementation stage (in-depth assessment) — Assessment center, 360-degree feedback

C. Result analysis stage — Reliability and validity test, significance analysis of differences

D. Feedback stage — Written test, psychological test

(B) Method Selection and Application Dimension (3 Questions, 15 Points)

8. A company is selecting a "Marketing Manager" (requiring "customer negotiation ability", "marketing strategy formulation ability", and "team management ability"). If it is necessary to prioritize the assessment of "marketing strategy formulation ability", which of the following assessment methods is most effective? ( )

A. Structured Interview — Ask questions like "Please describe a marketing strategy you formulated in the past and its effects"

B. In-Basket Test — Provide scenarios such as "product unsalable" and "competitor impact", and require formulating response strategies

C. Group Discussion — Organize a group task with the theme of "market share competition"

D. Psychological Test — Use the "Managerial Strategy Tendency Scale"

9. To verify the effectiveness of "an assessment plan for technical positions", the "mutual verification principle" should be adopted with multiple tools. If "technical practical operation test" (assessing professional skills) has been selected, which of the following tools is most suitable for matching verification? ( )

A. Resume Analysis — Verify the correlation between work experience and skills

B. Semi-Structured Interview — Gain in-depth understanding of ideas for solving technical problems to supplement the limitations of practical operation tests

C. MBTI Psychological Test — Assess the alignment between career interests and the position

D. Online Knowledge Test — Repeatedly assess professional theoretical knowledge

10. A startup company has a limited budget and needs to design a low-cost assessment plan for "administrative positions". Which combination best conforms to the dual principles of "cost-saving + effectiveness"? ( )

A. Resume analysis (preliminary screening) + structured interview (core assessment) + situational simulation (service scenarios)

B. Assessment center (in-basket test + group discussion) + 360-degree feedback

C. Offline written test (professional knowledge) + psychological test (Big Five Personality) + background check

D. Online knowledge test (administrative processes) + in-depth background check (more than 3 previous employers)

## II. Case Analysis Questions (5 Points Each, Total 50 Points)

All are single-choice questions. Among the four alternative answers for each question, select the correct one and fill its serial number in the bracket of the question stem.

Case 1: Manufacturing Company A Selects a Production Director

Case Background: Company A is a medium-sized manufacturing enterprise planning to select 1 Production Director, who will be responsible for overseeing workshop production efficiency, cost control, and team management (the existing team faces

issues of "chaotic production planning" and "cost overruns"). The initial plan of the HR department is: ① Screen resumes (focusing on "more than 5 years of manufacturing production management experience"); ② Conduct structured interviews (asking "how to reduce production costs"); ③ Hire. However, over the past two years, the two Production Directors hired under this plan have failed to solve the core problems, resulting in a 100% recruitment failure rate. The assessment plan needs to be optimized.

11. The core assessment purpose of Company A's Production Director selection determines the design direction of assessment indicators. Which of the following indicators should be the core assessment indicator? ( ) (Method Selection and Application Dimension)

- A. "English Proficiency" — Because the company has a small amount of foreign trade business
- B. "Production Planning Formulation and Cost Control Capability" — Directly addressing the core problems of the existing team
- C. "Educational Background" — Prioritizing candidates with a bachelor's degree or above
- D. "Innovative Thinking" — For future intelligent transformation of the factory

12. In the optimized plan, which assessment method is most effective for evaluating "cost control capability"? ( ) (Method Selection and Application Dimension)

- A. Psychological Test — Using the "Managerial Cost Awareness Scale"
- B. In-Basket Test — Providing "monthly production overrun reports" and "supplier quotations", requiring the formulation of cost reduction plans and explanation of basis

C. Group Discussion — Organizing a group task with the theme of "production resource allocation"

D. Resume Analysis — Verifying past experience in "cost reduction projects"

13. In accordance with the principles of "cost-saving + elimination first, then screening", which is the reasonable process sequence for the Production Director assessment? ( ) (Method Selection and Application Dimension)

A. Resume Analysis (Preliminary Screening: Eliminating candidates without manufacturing production management experience) → Online Knowledge Test (production management theory) → In-Basket Test (cost control) → Semi-Structured Interview (team management) → Background Check

B. In-Basket Test (cost control) → Resume Analysis (preliminary screening) → Semi-Structured Interview → Online Knowledge Test

C. Semi-Structured Interview → Background Check → Resume Analysis → In-Basket Test

D. Online Knowledge Test → Group Discussion → Resume Analysis → Background Check

14. What is the core reason for the high recruitment failure rate of the initial plan (resume screening + structured interview only)? ( ) (Scheme Design and Analysis Dimension)

A. Single assessment method, failing to cover in-depth evaluation of core capabilities such as "cost control" and "production planning"

B. Overly long assessment process, leading to the loss of excellent candidates

C. Too many assessment indicators, lacking focus

D. Inadequate qualifications of assessors, unable to use complex tools

## Case 2: Internet Company B Optimizes the Customer Service Position

### Assessment Plan

Case Background: Company B is an internet e-commerce enterprise. The existing assessment plan for customer service positions is: ① Online Psychological Test (MBTI personality type); ② Structured Interview (asking "how to handle customer complaints"); ③ Hire. However, in the past six months, the "3-month turnover rate" of new employees has reached 40%, and the customer complaint handling satisfaction rate is only 65% (lower than the industry average of 80%). The HR department found that: some MBTI "Extraverted" employees passed the assessment but lacked patience when actually handling complaints; candidates who were "eloquent" in interviews did not know how to record complaint information during practical operations.

15. Which core assessment point of the customer service position's "customer complaint handling capability" is not covered by the existing plan? ( ) (Method Selection and Application Dimension)

A. Personality type (e.g., Extraverted/Introverted)

B. Verbal expression ability

C. Proficiency in practical processes (e.g., complaint recording, problem classification, follow-up closure)

D. Educational background

16. When optimizing the customer service position assessment plan, which core assessment method should be added in accordance with the "effectiveness principle"? ( ) (Method Selection and Application Dimension)

- A. Resume Analysis — Screening candidates with "customer service experience"
- B. Situational Simulation — Simulating scenarios such as "customers angrily complaining about product quality issues", requiring completion of the full process of "listening - recording - proposing solutions - committing to follow-up"
- C. Written Test — Assessing theoretical knowledge of "e-commerce platform rules"
- D. 360-Degree Feedback — Consulting previous employers' evaluations of candidates

17. To verify the effectiveness of the optimized plan, which is the most scientific verification method? ( ) (Scheme Design and Analysis Dimension)

- A. Comparing the differences in "new employee 3-month turnover rate" and "customer complaint satisfaction rate" before and after optimization
- B. Calculating whether the assessment cost of the optimized plan is reduced
- C. Investigating candidates' satisfaction with the new plan
- D. Calculating the correlation between assessment scores and interview scores

### **Case 3: Company C Conducts Assessment for Cross-Departmental Project Team Allocation**

Case Background: Company C needs to select 2 employees from each of the Technology Department, Product Department, and Operations Department to form a cross-departmental project team for promoting the "digital transformation project". The existing assessment plan is: ① Each department recommends employees with "top 30% performance"; ② Organizes a group discussion with the theme of "digital transformation"; ③ Hires based on scores of discussion performance. However, after the project was launched, problems such as "low communication efficiency between

technical and product employees" and "operations employees being unfamiliar with technical logic" emerged. The plan defects need to be diagnosed and optimized.

18. The core goal of the cross-departmental project team assessment should focus on ( ) (Method Selection and Application Dimension)

- A. Selecting employees with "optimal performance"
- B. Selecting employees with "solid theoretical knowledge of digital transformation"
- C. Selecting employees with "cross-departmental collaboration capabilities + job professional capabilities + digital awareness"
- D. Selecting employees with "strongest communication and expression capabilities"

19. What is the core defect of the existing plan (department recommendation + group discussion)? ( ) (Scheme Design and Analysis Dimension)

- A. Overly long assessment process, consuming too much time
- B. Failing to evaluate the "compatibility between job professional capabilities and cross-departmental collaboration", and only judging based on discussion performance, leading to insufficient professional complementarity
- C. Overly complex assessment methods, resulting in high costs
- D. Failing to adopt psychological tests, unable to evaluate personality compatibility

20. When optimizing the project team assessment plan, which assessment link should be supplemented as a priority? ( ) (Scheme Design and Analysis Dimension)

- A. Adding an "online written test on digital transformation knowledge" to eliminate candidates with weak theoretical foundations

- B. Adding a "cross-departmental collaboration situational simulation" (e.g., "technology-product demand docking" scenarios) to evaluate collaboration compatibility
- C. Adding a "background check" to verify employees' past experience in cross-departmental projects
- D. Adding a "Big Five Personality Test" to screen employees with "high agreeableness"

## Test Paper

### Post-Test

Test Questions for "Operational Process of Personnel Quality Assessment"

Total Score: 100 Points | Time Limit: 60 Minutes

Name: \_\_\_\_\_ | Class: \_\_\_\_\_

#### I. Single-Choice Questions (5 Points Each, Total 50 Points)

Among the four alternative answers for each question, select the correct one and fill its serial number in the bracket of the question stem.

(A) Process Knowledge Memory Dimension (7 Questions, 35 Points)

1. In the quality control of the "implementation stage" of personnel quality assessment, what core attribute of the assessment does "parallel testing" aim to verify? ( )

A. Content Validity — Alignment between assessment content and job requirements

B. Test-Retest Reliability — Consistency of results of the same assessment tool at different times

C. Parallel-Form Reliability — Consistency of results of two equivalent assessment tools

D. Construct Validity — Alignment between assessment results and theoretical framework

2. The "two-way interaction principle" should be followed in the assessment result feedback stage. Which of the following feedback contents best conforms to this principle? ( )

A. Only inform the candidate that "the total assessment score is 80 points, which is qualified"

B. Explain that "your score in 'teamwork ability' is 75 points (lower than the average of 82 points). Specifically, you spoke less actively in the group discussion. It is recommended to increase participation in group projects later"

C. Only provide a "radar chart of scores in each dimension" without any interpretation

D. Inform that "you failed the assessment, and the specific reason will not be disclosed"

3. In the "objective determination" stage of personnel quality assessment, it is necessary to conduct job demand analysis through multiple methods. Which of the following is the correct sequence of core steps for constructing a job competency model? ( )

A. ②→①→③→④ (② Clarify core job responsibilities and tasks through job analysis; ① Collect behavioral data of high-performing employees using the Behavioral Event Interview (BEI); ③ Extract competency indicators and classify dimensions; ④ Invite experts to verify the consistency of indicators)

B. ①→②→③→④ (① Collect behavioral data of high-performing employees using BEI; ② Clarify core job responsibilities and tasks through job analysis; ③ Extract competency indicators and classify dimensions; ④ Invite experts to verify the consistency of indicators)

C. ②→③→①→④ (② Clarify core job responsibilities and tasks through job analysis; ③ Extract competency indicators and classify dimensions; ① Collect behavioral data of high-performing employees using BEI; ④ Invite experts to verify the consistency of indicators)

D. ①→③→②→④ (① Collect behavioral data of high-performing employees using BEI; ③ Extract competency indicators and classify dimensions; ② Clarify core job responsibilities and tasks through job analysis; ④ Invite experts to verify the consistency of indicators)

4. In the assessment data processing link, if it is necessary to analyze "whether there is a significant difference in assessment scores between the experimental group and the control group" and the data of both groups follow a normal distribution, which statistical method should be used? ( )

A. Independent Samples t-Test — Compare the mean difference between two independent samples

B. Paired Samples t-Test — Compare the mean difference of the same sample in pre-test and post-test

C. Chi-Square Test — Analyze the distribution difference of categorical data

D. Analysis of Variance (ANOVA) — Compare the mean difference of three or more samples

5. The selection of assessment tools should match the core tasks of the "implementation stage". Which of the following matches between tools and the implementation stage is incorrect? ( )

A. Preparation stage (preliminary screening) — Resume analysis, online knowledge test

B. Implementation stage (in-depth assessment) — Assessment center, 360-degree feedback

C. Result analysis stage — Reliability and validity test, significance analysis of differences

D. Feedback stage — Written test, psychological test

6. Which of the following descriptions of the "assessment implementation process" does NOT conform to the "cost-saving principle"? ( )

A. Assessment for grassroots customer service positions: First screen candidates with "more than 1 year of service experience" through resume analysis, then conduct written tests and situational simulations

B. Assessment for senior management positions: First conduct an assessment center (in-basket test + group discussion), then verify work experience through resume analysis

C. Assessment for technical positions: First eliminate candidates with "inadequate professional knowledge" through written tests, then conduct technical practical operations and structured interviews

D. Assessment for fresh graduates: First conduct an online psychological test for initial screening, then organize offline centralized interviews

7. When designing assessment indicators, scientific methods are required to determine indicator weights. Which of the following methods is an "objective weighting method" and suitable for scenarios with historical assessment data? ( )

A. Analytic Hierarchy Process (AHP) — Construct a judgment matrix based on experts' subjective judgments

B. Entropy Weight Method — Calculate weights based on the dispersion degree of indicator data

C. Delphi Method — Reach a weight consensus through multiple rounds of expert consultation

D. Direct Assignment Method — Assessors directly assign weights based on experience

(B) Method Selection and Application Dimension (3 Questions, 15 Points)

8. A company is selecting a "Marketing Manager" (requiring "customer negotiation ability", "marketing strategy formulation ability", and "team management ability"). If it is necessary to prioritize the assessment of "marketing strategy formulation ability", which of the following assessment methods is most effective? ( )

A. Structured Interview — Ask questions like "Please describe a marketing strategy you formulated in the past and its effects"

B. In-Basket Test — Provide scenarios such as "product unsalable" and "competitor impact", and require formulating response strategies

C. Group Discussion — Organize a group task with the theme of "market share competition"

D. Psychological Test — Use the "Managerial Strategy Tendency Scale"

9. To verify the effectiveness of "an assessment plan for technical positions", the "mutual verification principle" should be adopted with multiple tools. If "technical practical operation test" (assessing professional skills) has been selected, which of the following tools is most suitable for matching verification? ( )

A. Resume Analysis — Verify the correlation between work experience and skills

B. Semi-Structured Interview — Gain in-depth understanding of ideas for solving technical problems to supplement the limitations of practical operation tests

C. MBTI Psychological Test — Assess the alignment between career interests and the position

D. Online Knowledge Test — Repeatedly assess professional theoretical knowledge

10. A startup company has a limited budget and needs to design a low-cost assessment plan for "administrative positions". Which combination best conforms to the dual principles of "cost-saving + effectiveness"? ( )

A. Resume analysis (preliminary screening) + structured interview (core assessment) + situational simulation (service scenarios)

B. Assessment center (in-basket test + group discussion) + 360-degree feedback

C. Offline written test (professional knowledge) + psychological test (Big Five Personality) + background check

D. Online knowledge test (administrative processes) + in-depth background check (more than 3 previous employers)

## II. Case Analysis Questions (5 Points Each, Total 50 Points)

All are single-choice questions. Among the four alternative answers for each question, select the correct one and fill its serial number in the bracket of the question stem.

Case 1: Internet Company B Optimizes the Customer Service Position Assessment Plan

Case Background: Company B is an internet e-commerce enterprise. The existing assessment plan for customer service positions is: ① Online Psychological Test (MBTI personality type); ② Structured Interview (asking "how to handle customer complaints"); ③ Hire. However, in the past six months, the "3-month turnover rate" of new employees has reached 40%, and the customer complaint handling satisfaction rate is only 65% (lower than the industry average of 80%). The HR department found that: some MBTI "Extraverted" employees passed the assessment

but lacked patience when actually handling complaints; candidates who were "eloquent" in interviews did not know how to record complaint information during practical operations.

11. Which core assessment point of the customer service position's "customer complaint handling capability" is not covered by the existing plan? ( ) (Method Selection and Application Dimension)

- A. Personality type (e.g., Extraverted/Introverted)
- B. Verbal expression ability
- C. Proficiency in practical processes (e.g., complaint recording, problem classification, follow-up closure)
- D. Educational background

12. When optimizing the customer service position assessment plan, which core assessment method should be added in accordance with the "effectiveness principle"? ( ) (Method Selection and Application Dimension)

- A. Resume Analysis — Screening candidates with "customer service experience"
- B. Situational Simulation — Simulating scenarios such as "customers angrily complaining about product quality issues", requiring completion of the full process of "listening - recording - proposing solutions - committing to follow-up"
- C. Written Test — Assessing theoretical knowledge of "e-commerce platform rules"
- D. 360-Degree Feedback — Consulting previous employers' evaluations of candidates

13. To verify the effectiveness of the optimized plan, which is the most scientific verification method? ( ) (Scheme Design and Analysis Dimension)

- A. Comparing the differences in "new employee 3-month turnover rate" and "customer complaint satisfaction rate" before and after optimization
- B. Calculating whether the assessment cost of the optimized plan is reduced
- C. Investigating candidates' satisfaction with the new plan
- D. Calculating the correlation between assessment scores and interview scores

### Case 2: Manufacturing Company A Selects a Production Director

Case Background: Company A is a medium-sized manufacturing enterprise planning to select 1 Production Director, who will be responsible for overseeing workshop production efficiency, cost control, and team management (the existing team faces issues of "chaotic production planning" and "cost overruns"). The initial plan of the HR department is: ① Screen resumes (focusing on "more than 5 years of manufacturing production management experience"); ② Conduct structured interviews (asking "how to reduce production costs"); ③ Hire. However, over the past two years, the two Production Directors hired under this plan have failed to solve the core problems, resulting in a 100% recruitment failure rate. The assessment plan needs to be optimized.

14. The core assessment purpose of Company A's Production Director selection determines the design direction of assessment indicators. Which of the following indicators should be the core assessment indicator? ( ) (Method Selection and Application Dimension)

- A. "English Proficiency" — Because the company has a small amount of foreign trade business

B. "Production Planning Formulation and Cost Control Capability" — Directly addressing the core problems of the existing team

C. "Educational Background" — Prioritizing candidates with a bachelor's degree or above

D. "Innovative Thinking" — For future intelligent transformation of the factory

15. In the optimized plan, which assessment method is most effective for evaluating "cost control capability"? ( ) (Method Selection and Application Dimension)

A. Psychological Test — Using the "Managerial Cost Awareness Scale"

B. In-Basket Test — Providing "monthly production overrun reports" and "supplier quotations", requiring the formulation of cost reduction plans and explanation of basis

C. Group Discussion — Organizing a group task with the theme of "production resource allocation"

D. Resume Analysis — Verifying past experience in "cost reduction projects"

16. In accordance with the principles of "cost-saving + elimination first, then screening", which is the reasonable process sequence for the Production Director assessment? ( ) (Method Selection and Application Dimension)

A. Resume Analysis (Preliminary Screening: Eliminating candidates without manufacturing production management experience) → Online Knowledge Test (production management theory) → In-Basket Test (cost control) → Semi-Structured Interview (team management) → Background Check

B. In-Basket Test (cost control) → Resume Analysis (preliminary screening) → Semi-Structured Interview → Online Knowledge Test

C. Semi-Structured Interview → Background Check → Resume Analysis → In-Basket Test

D. Online Knowledge Test → Group Discussion → Resume Analysis → Background Check

17. What is the core reason for the high recruitment failure rate of the initial plan (resume screening + structured interview only)? ( ) (Scheme Design and Analysis Dimension)

A. Single assessment method, failing to cover in-depth evaluation of core capabilities such as "cost control" and "production planning"

B. Overly long assessment process, leading to the loss of excellent candidates

C. Too many assessment indicators, lacking focus

D. Inadequate qualifications of assessors, unable to use complex tools

Case 3: Company C Conducts Assessment for Cross-Departmental Project Team Allocation

Case Background: Company C needs to select 2 employees from each of the Technology Department, Product Department, and Operations Department to form a cross-departmental project team for promoting the "digital transformation project".

The existing assessment plan is: ① Each department recommends employees with "top 30% performance"; ② Organizes a group discussion with the theme of "digital transformation"; ③ Hires based on scores of discussion performance. However, after the project was launched, problems such as "low communication efficiency between technical and product employees" and "operations employees being unfamiliar with technical logic" emerged. The plan defects need to be diagnosed and optimized.

19. The core goal of the cross-departmental project team assessment should focus on ( ) (Method Selection and Application Dimension)

- A. Selecting employees with "optimal performance"
- B. Selecting employees with "solid theoretical knowledge of digital transformation"
- C. Selecting employees with "cross-departmental collaboration capabilities + job professional capabilities + digital awareness"
- D. Selecting employees with "strongest communication and expression capabilities"

19. What is the core defect of the existing plan (department recommendation + group discussion)? ( ) (Scheme Design and Analysis Dimension)

- A. Overly long assessment process, consuming too much time
- B. Failing to evaluate the "compatibility between job professional capabilities and cross-departmental collaboration", and only judging based on discussion performance, leading to insufficient professional complementarity
- C. Overly complex assessment methods, resulting in high costs
- D. Failing to adopt psychological tests, unable to evaluate personality compatibility

20. When optimizing the project team assessment plan, which assessment link should be supplemented as a priority? ( ) (Scheme Design and Analysis Dimension)

- A. Adding an "online written test on digital transformation knowledge" to eliminate candidates with weak theoretical foundations
- B. Adding a "cross-departmental collaboration situational simulation" (e.g., "technology-product demand docking" scenarios) to evaluate collaboration compatibility

C. Adding a "background check" to verify employees' past experience in cross-departmental projects

D. Adding a "Big Five Personality Test" to screen employees with "high agreeable

## Appendix C8

### Assessment Form for IOC Scoring Form for the Test "Operational Process of Personnel Quality

**Research Title:** Development of blended learning model for undergraduate Students Majoring in Management Learning Effectiveness in Pingdingshan university.

**Research Objectives:** 3.To evaluate the effectiveness of the developed blended learning model.

Assessor: \_\_\_\_\_

Position: \_\_\_\_\_

Workplace: \_\_\_\_\_

**Directions:** Please assess the congruence between the model's evaluation items and the research objective by putting "√" in the corresponding box according to the following criteria:

- +1: If you think the item CAN measure the core content of the research objective
- 0: If you are NOT SURE whether the item can measure the core content of the research objective
- 1: If you think the item CANNOT measure the core content of the research objective

## Part 1. Basic Information

Category	Details
Name of Assessment Tool	Test "Operational Process of Personnel Quality Assessment" (Total Score: 100 Points, Time Limit: 60 Minutes; Question Type: I. Single-Choice Questions (50 Points) + II. Case Analysis Questions (50 Points))
Preset Core Objectives	To assess three competence dimensions of undergraduates majoring in Management at Pingdingshan University regarding the "operational process of personnel quality assessment":1. <b>Process Knowledge Memory</b> : Master core concepts and steps of the full assessment process (e.g., competency model construction, reliability/validity verification, data analysis methods);2. <b>Method Selection and Application</b> : Select appropriate assessment methods based on job scenarios (e.g., matching methods for Marketing Manager, Production Director positions);3. <b>Scheme Design and Analysis</b> : Diagnose and optimize defects in assessment schemes (e.g., solving high recruitment failure rates, low customer satisfaction issues)
Expert Assessment Info	Name: _____ Professional Title/Field: _____ Assessment Date: ____ / ____ / ____
Number of Experts	5 experts (interdisciplinary configuration to ensure professionalism):- 2 Management Education Experts (familiar with undergraduate management teaching objectives);- 2 Human Resources Practice Experts (rich experience in corporate assessment scheme design);- 1 Educational Measurement Expert (proficient in test validity evaluation)

## Part 2. Core Assessment Dimensions

Items	Contents	Results			Remarks
		Assessment	+1	0	
<b>Section 1</b>	Process Knowledge Memory Dimension (Preset Objective: Master knowledge of the full assessment process)				
<b>Part 1</b>	Core Assessment of Process Knowledge Memory				
No. 1	1.1 Alignment of Question Quantity and Score Weight: 7 questions in the Process Knowledge Memory dimension (accounting for 35% of single-choice questions), which matches the preset objective of "35% score proportion for knowledge memory"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 2	1.2 Completeness of Content Coverage: Questions cover core links of the full assessment process (Objective Setting → Indicator Design → Implementation → Data Processing → Feedback), e.g., Question 1 (competency model construction)、Question 4 (data analysis method)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 3	1.3 Knowledge Targeting: Questions focus on core concepts of the "operational process", e.g., reliability/validity types (Question 3)、 statistical method selection (Question 4)、 process principles (Question 6 cost-saving principle)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 4	1.4 Difficulty Adaptability: Question difficulty matches the teaching objectives of undergraduate Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Items	Contents	Results			Remarks
		Assessment	+1	0	
	majors (no over-range content such as advanced statistical models, no overly basic content such as simple definition memorization)				
<b>Section 2</b>	Method Selection and Application Dimension (Preset Objective: Select assessment methods based on job scenarios)				
<b>Part 1</b>	Core Assessment of Method Selection and Application				
No. 5	2.1 Alignment of Question Quantity and Score Weight: 10 questions in this dimension (3 single-choice + 7 case analysis), accounting for 50% of the total score, which aligns with the preset objective of "prioritizing method application ability"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 6	2.2 Completeness of Method Coverage: Questions cover core assessment methods, e.g., resume analysis (Question 10)、 structured interview (Question 8)、 assessment center (Question 12 in-basket test)、 situational simulation (Question 16)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 7	2.3 Scenario Adaptability: Questions design method selection tasks based on real job scenarios, e.g., Production Director (Case 1)、 Customer Service Position (Case 2)、 Cross-departmental Project Team (Case 3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 8	2.4 Competence Discrimination: Questions can	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Items	Contents	Results			Remarks
		Assessment			
		+1	0	-1	
	effectively distinguish students who "can select methods" from those who "cannot" (e.g., distractors are reasonable: Question 8 distinguishes "structured interview" vs "in-basket test" for strategy ability)				
<b>Section 3</b>	Scheme Design and Analysis Dimension (Preset Objective: Diagnose and optimize scheme defects)				
<b>Part 1</b>	Core Assessment of Scheme Design and Analysis				
No. 9	3.1 Alignment of Question Quantity and Score Weight: 3 questions in this dimension (3 case analysis), accounting for 15% of the total score, which matches the preset objective of "assessing high-order scheme optimization ability"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 10	3.2 Completeness of Competence Coverage: Questions involve high-level competencies, e.g., scheme defect diagnosis (Question 14 recruitment failure reason)、 process optimization (Question 13 assessment process sequence)、 cost-effectiveness balance (Question 10 low-cost plan)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 11	3.3 Case Authenticity: Question cases align with practical pain points in corporate HR management, e.g., "100% recruitment failure rate" (Case 1)、 "40% new employee turnover rate" (Case 2)、 "cross-department communication inefficiency" (Case 3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Items	Contents	Results			Remarks
		Assessment	+1	0	
No. 12	3.4 Uniqueness of Answers: Questions have a unique reasonable answer (no ambiguity), e.g., Question 14 core reason for failure is "single method" (Option A), other options have obvious logical flaws (e.g., Option B "overly long process" is inconsistent with case background)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Section 4</b>	Overall Design Rationality				
<b>Part 1</b>	Core Assessment of Overall Design Rationality				
No. 13	4.1 Question Type Adaptability: Question types (single-choice + case analysis) match the three competence dimensions: single-choice for knowledge memory, case analysis for method application/scheme analysis (no mismatch between type and competence)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 14	4.2 Time Adaptability: 60-minute time limit supports completing 20 questions (10 single-choice + 10 case analysis) — single-choice takes ~1-2 minutes/question, case analysis takes ~3-4 minutes/question (no excessive time pressure or looseness)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No. 15	4.3 Rationality of Score Distribution: Each question is worth 5 points, matching the importance of competencies (core dimensions such as method application account for 50%, no low scores for key competencies)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

## Appendix D

The Results of the Quality Analysis of Research Instruments

Appendix D1:IOC Scoring Form for the Questionnaire on the Current Situation and Learning Effects of Blended Learning

Appendix D2:Round 1 IOC Scoring Form for the Blended Learning Model

Appendix D3:Round 2 IOC Scoring Form for the Blended Learning Model

Appendix D4:IOC Scoring Form for the Test "Operational Process of Personnel Quality Assessment"

## Appendix D1

Appendix D1: IOC Scoring Form for the Questionnaire on the Current Situation and Learning Effects of Blended Learning



Step	Evaluation Item (Abbreviation)	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Number of +1	Number of -1	IOC Value	Conclusion
	Q8: Utilization of Blended Learning Resources (Online Courses/Practice Tests)	+1	+1	+1	+1	0	4	0	0.8	Pass
	Q9: Participation in Online Activities (Watching Videos/Online Tests)	+1	+1	0	+1	+1	4	0	0.8	Pass
	Q10: Overall Satisfaction with Blended Learning Model	+1	0	+1	+1	+1	4	0	0.8	Pass
	Q11: Interaction with Teachers/Classmates in Blended Learning	+1	+1	+1	-1	+1	4	1	0.6	Pass
	Q12: Blended Learning's Help in Mastering Course Knowledge	+1	+1	+1	+1	+1	5	0	1.0	Pass
Part 3: Influencing Factors of Blended Learning Effects	(Used to identify effect factors, correspond to Research Objective 2)									
(A) Student Individual Factors										
	Q13: Clear Learning Goals & Strong Motivation	+1	+1	+1	0	+1	4	0	0.8	Pass
	Q14: Positive Attitude &	+1	0	+1	+1	+1	4	0	0.8	Pass

Step	Evaluation Item (Abbreviation)	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Number of +1	Number of -1	IOC Value	Conclusion
	Proactive Participation in Blended Learning									
	Q15: Independent Arrangement of Online Learning Time	+1	+1	0	+1	0	3	0	0.6	Pass
	Q16: Integration of Online Resources & Offline Content for Review	+1	+1	+1	+1	0	4	0	0.8	Pass
(B) Learning Behavior Factors										
	Q17: Active Participation in Online/Offline Discussions	+1	+1	+1	-1	+1	4	1	0.6	Pass
	Q18: Regular Summary & Reflection to Adjust Learning Methods	+1	0	+1	+1	+1	4	0	0.8	Pass
	Q19: Timely Completion of Online/Offline Assignments	+1	+1	+1	+1	+1	5	0	1.0	Pass
	Q20: Proactive Problem-Solving (Consulting Materials/Asking for Help)	+1	+1	0	+1	+1	4	0	0.8	Pass
	Q21: Sufficient Weekly Independent Learning Time for	+1	0	+1	0	+1	3	0	0.6	Pass

Step	Evaluation Item (Abbreviation)	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Number of +1	Number of -1	IOC Value	Conclusion
	Blended Learning									
	Q22: Help of Real-Time Feedback (Quiz Answers/Question Explanations)	0	+1	0	+1	+1	3	0	0.6	Pass
(C) Learning Environment & Resources										
	Q23: Clarity of Online Platform Operation Guidelines (Login/Assignment Submission)	+1	+1	+1	+1	0	4	0	0.8	Pass
	Q24: Abundance & Practicality of Blended Learning Materials (Textbooks/References)	+1	+1	0	+1	+1	4	0	0.8	Pass
	Q25: Ease of Operation & Learning Support of Online Platforms	+1	+1	+1	-1	+1	4	1	0.6	Pass
	Q26: Accessibility of Learning Resources (Materials/Exercises/References)	+1	+1	+1	+1	+1	5	0	1.0	Pass

1.IOC Value Calculation Formula:  $IOC = [\text{Number of +1 Ratings} - \text{Number of -1 Ratings}] / \text{Total Number of Experts (5)}$

2.Conclusion Criteria:  $IOC \geq 0.5 = \text{Pass}$ ;  $IOC < 0.5 = \text{Needs Revision}$

3.Analysis of the Data Results from the IOC Scoring Summary Table of the Student Questionnaire

Based on the IOC (Item Objective Congruence) scoring data of 26 items in the Questionnaire on the Current Situation and Learning Effects of Blended Learning for Undergraduate Students evaluated by 5 experts, the overall analysis results are as follows:

From the perspective of overall validity performance, the IOC values of all 26 questionnaire items fall within the range of 0.6–1.0, with no items below the 0.5 qualified threshold. The IOC value  $\geq 0.5$  ( $SD=0.12$ ), indicating that the questionnaire as a whole is highly consistent with the two core research objectives—"investigating the current situation of blended learning (Research Objective 1)" and "identifying the influencing factors of learning effects (Research Objective 2)"—and its content validity complies with academic research standards.

In conclusion, the IOC scoring results of this student questionnaire indicate that it meets the requirements for content validity and can be used in subsequent empirical research on the investigation of blended learning status and the analysis of factors influencing learning effects.

## Appendix D2

Appendix D2: Round 1 IOC Scoring Form for the Blended Learning Model

Step	Evaluation Item (Abbreviation)	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Number of +1 Ratings	Number of -1 Ratings	IOC Value	Conclusion
1. Clarifying Learning Outcomes	1.1 Quantifiable Objectives	+1	+1	+1	0	+1	4	0	0.8	Pass
	1.2 Sound Platform Release Mechanism	+1	+1	+1	+1	-1	4	1	0.6	Pass
	1.3 Clear Evaluation Criteria	+1	+1	+1	+1	0	4	0	0.8	Pass
2. Reverse Curriculum Design	2.1 Connection Between Module Goals and Overall Outcomes	+1	+1	+1	+1	+1	5	0	1.0	Pass
	2.2 Rational Logic of Reverse Design for Teaching Activities	+1	+1	+1	0	+1	4	0	0.8	Pass
	2.3 Alignment of Evaluation Methods with Goals	+1	+1	+1	+1	+1	5	0	1.0	Pass
3. Designing WebQuest Tasks	3.1 Effectiveness of Task Scenario Introduction	+1	+1	+1	-1	+1	4	1	0.6	Pass

Step	Evaluation Item (Abbreviation)	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Number of +1 Ratings	Number of -1 Ratings	IOC Value	Conclusion
	3.2 Resource Organization Supporting the Inquiry Process	+1	0	+1	+1	+1	4	0	0.8	Pass
	3.3 Diverse Evaluation Covering WebQuest Components	0	+1	0	+1	+1	3	0	0.6	Pass
4. Organizing Collaborative Learning	4.1 Group Task Design Promoting Collaboration	+1	+1	+1	+1	0	4	0	0.8	Pass
	4.2 Quick Answer Question Bank Enhancing Participation	0	+1	+1	+1	+1	4	0	0.8	Pass
	4.3 Timeliness of Teacher Feedback Mechanism	+1	0	+1	+1	+1	4	0	0.8	Pass
5. Addressing Individual Differences	5.1 Diverse Resources Meeting Different Learning Styles	+1	+1	0	0	0	2	0	0.4	No Pass
	5.2 Mechanism for Personalized Task Selection	0	0	+1	+1	0	2	0	0.4	No Pass
	5.3 Quick	+1	+1	0	+1	+1	4	0	1.0	Pass

Step	Evaluation Item (Abbreviation)	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Number of +1 Ratings	Number of -1 Ratings	IOC Value	Conclusion
	Answer Function Testing Knowledge Mastery									
6. Evaluation and Improvement	6.1 Combination of Formative and Summative Evaluation	+1	+1	+1	+1	+1	5	0	1.0	Pass
	6.2 Learning Data Analysis Driving Optimization	+1	0	+1	+1	+1	4	0	0.8	Pass
	6.3 Clear Dynamic Adjustment Mechanism	+1	+1	+1	0	+1	4	0	0.8	Pass

Overall Congruence

Low-Congruence Items

Two items had an IOC < 0.50, both concentrated in the dimension of "Step 5: Addressing Individual Differences":

Item 5.1 "Diverse Resources Meeting Different Learning Styles": IOC = 0.40

Item 5.2 "Mechanism for Personalized Task Selection": IOC = 0.40

## Appendix D3

Appendix D3: Round 2 IOC Scoring Form for the Blended Learning Model

Step	Evaluation Item (Abbreviation)	Expert	Expert	Expert	Expert	Expert	Number of +1 Ratings	Number of -1 Ratings	IOC Value	Conclusion
		1	2	3	4	5				
1. Clarifying Learning Outcomes	1.1 Quantifiable Objectives	+1	+1	+1	0	+1	4	0	0.8	Pass
	1.2 Sound Platform Release Mechanism	+1	+1	+1	+1	-1	4	1	0.6	Pass
	1.3 Clear Evaluation Criteria	+1	+1	+1	+1	0	4	0	0.8	Pass
2. Reverse Curriculum Design	2.1 Connection Between Module Goals and Overall Outcomes	+1	+1	+1	+1	+1	5	0	1.0	Pass
	2.2 Rational Logic of Reverse Design for Teaching Activities	+1	+1	+1	0	+1	4	0	0.8	Pass
	2.3 Alignment of Evaluation Methods with Goals	+1	+1	+1	+1	+1	5	0	1.0	Pass
3. Designing WebQuest Tasks	3.1 Effectiveness of Task Scenario	+1	+1	+1	-1	+1	4	1	0.6	Pass

Step	Evaluation Item (Abbreviation)	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Number of +1 Ratings	Number of -1 Ratings	IOC Value	Conclusion
	Introduction									
	3.2 Resource Organization Supporting the Inquiry Process	+1	0	+1	+1	+1	4	0	0.8	Pass
	3.3 Diverse Evaluation Covering WebQuest Components	0	+1	0	+1	+1	3	0	0.6	Pass
4. Organizing Collaborative Learning	4.1 Group Task Design Promoting Collaboration	+1	+1	+1	+1	0	4	0	0.8	Pass
	4.2 Quick Answer Question Bank Enhancing Participation	0	+1	+1	+1	+1	4	0	0.8	Pass
	4.3 Timeliness of Teacher Feedback Mechanism	+1	0	+1	+1	+1	4	0	0.8	Pass
5. Addressing Individual Differences	5.1 Diverse Resources Meeting Different Learning Styles	+1	+1	0	+1	+1	4	0	0.8	Pass
	5.2 Mechanism for Personalized Task Selection	+1	0	+1	+1	+1	2	0	0.8	Pass

Step	Evaluation Item (Abbreviation)	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Number of +1 Ratings	Number of -1 Ratings	IOC Value	Conclusion
	5.3 Quick Answer Function Testing Knowledge Mastery	+1	+1	0	+1	+1	4	0	1.0	Pass
6. Evaluation and Improvement	6.1 Combination of Formative and Summative Evaluation	+1	+1	+1	+1	+1	5	0	1.0	Pass
	6.2 Learning Data Analysis Driving Optimization	+1	0	+1	+1	+1	4	0	0.8	Pass
	6.3 Clear Dynamic Adjustment Mechanism	+1	+1	+1	0	+1	4	0	0.8	Pass

Through expert IOC verification and two rounds of revisions:

Model Effectiveness Confirmation: All 18 items achieved an IOC  $\geq 0.60$  (mean = 0.89, SD = 0.08), meeting the acceptable threshold.

Significant Improvement of Original Low-Scoring Items:

- Item 5.1: IOC increased from 0.40 to 0.80;
- Item 5.2: IOC increased from 0.40 to 0.80

## Appendix D4

Appendix D4:IOC Scoring Form for the Test "Operational Process of Personnel Quality Assessment"

Step	Evaluation Item (Abbreviation)	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Number of +1	Number of -1	IOC Value	Conclusion
Section 1: Process Knowledge Memory Dimension	(Preset Objective: Master knowledge of the full assessment process)									
Part 1: Core Assessment	1.1 Qty & Score Weight Alignment (7 questions, 35% of single-choice)	+1	+1	+1	0	+1	4	0	0.8	Pass
	1.2 Content Coverage Completeness (covers core assessment links)	+1	+1	+1	+1	0	4	0	0.8	Pass
	1.3 Knowledge Targeting (focuses on core operational concepts)	+1	0	+1	+1	+1	4	0	0.8	Pass
	1.4 Difficulty Adaptability (matches Management undergrad teaching objectives)	+1	+1	0	+1	0	3	0	0.6	Pass
Section 2: Method Selection & Application Dimension	(Preset Objective: Select assessment methods based on job scenarios)									
Part 1: Core	2.1 Qty & Score Weight	+1	+1	+1	+1	+1	5	0	1.0	Pass

Step	Evaluation Item (Abbreviation)	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Number of +1	Number of -1	IOC Value	Conclusion
Assessment	Alignment (10 questions, 50% of total score)									
	2.2 Method Coverage Completeness (covers core assessment methods)	+1	+1	0	+1	+1	4	0	0.8	Pass
	2.3 Scenario Adaptability (tasks based on real job scenarios)	+1	+1	+1	-1	+1	4	1	0.6	Pass
	2.4 Competence Discrimination (distinguishes method selection ability)	+1	+1	+1	0	+1	4	0	0.8	Pass
Section 3: Scheme Design & Analysis Dimension	(Preset Objective: Diagnose and optimize scheme defects)									
Part 1: Core Assessment	3.1 Qty & Score Weight Alignment (3 questions, 15% of total score)	+1	+1	0	+1	+1	4	0	0.8	Pass
	3.2 Competence Coverage Completeness (involves high-order competencies)	+1	+1	+1	+1	0	4	0	0.8	Pass
	3.3 Case Authenticity (aligns with	+1	+1	+1	0	+1	4	0	0.8	Pass

Step	Evaluation Item (Abbreviation)	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Number of +1	Number of -1	IOC Value	Conclusion
	corporate HR pain points)									
	3.4 Answer Uniqueness (no ambiguity, single reasonable answer)	+1	0	+1	+1	0	3	0	0.6	Pass
Section 4: Overall Design Rationality										
Part 1: Core Assessment	4.1 Question Type Adaptability (matches competence dimensions)	+1	+1	+1	+1	0	4	0	0.8	Pass
	4.2 Time Adaptability (60-minute limit supports 20 questions)	+1	0	+1	+1	0	3	0	0.6	Pass
	4.3 Score Distribution Rationality (5 points matches competency importance)	+1	+1	+1	+1	+1	5	0	1.0	Pass

From the perspective of overall validity, the IOC values of the 15 assessment items in this test all fall within the range of 0.6-1.0. All items exceed the 0.5 qualified threshold, and their content validity fully meets the normative requirements for test tools in academic research.

From the perspective of application adaptability, combined with the expert scoring logic and conclusions, this test can effectively align with the core objective of "assessing the competence of undergraduate students majoring in Management regarding the operational process of personnel quality assessment" and can be directly applied to subsequent teaching effectiveness verification or student competence assessment practice.

Appendix E  
Certificate of English



This is to certify that

**Zhang Qianhui**

Achieved BSRU English Proficiency Test (BSRU-TEP) level

**C2**

Given on 30<sup>th</sup> November 2024

Assistant Professor Dr Kulsirin Aphiratvoradej

Director

## Appendix F

The Document for Acceptance Research

NO. PM. 6837/2568

25 August 2025

Re: Academic Paper Acceptance Letter

Dear Zhang Qianhui and Prapai Sridama

We are pleased to inform you that your paper, “**Development and Effectiveness Evaluation of an OBE-WebQuest Blended Learning Model for Undergraduate Management,**” has been considered by a Peer Review Committee comprised of two reviewers and received favorable opinions.

As a result, your paper will be published in the Journal of Wisdom in Political Science and Multidisciplinary Sciences in the following issue: Volume 8, Issue 6, November – December 2025. We are thankful that you have sent your paper for publication. The editorial staff looks forward to receiving an exciting and beneficial paper from you for potential publication soon.

Again, thank you for working with us. The Journal of Wisdom in Political Science and Multidisciplinary Sciences has been categorized in Tier 2 of the Thai Citation Index (TCI). It will be classified as such for four years, from January 1, 2025, to December 31, 2029.

Looking forward to a good collaboration,

Sincerely yours,

*Pol. Lt. Gen. Sunthan Chayanon.*

(Asst.Prof.Pol.Lt.Gen. Sunthan Chayanon, Ph.D.)

Editor-in-Chief

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## Appendix G

User Manual for The Blended Learning Model

## User Manual for the Blended Learning Model

### 1. Overview

#### 1.1 Purpose of the Manual

This appendix contains a comprehensive user manual for the OBE-WebQuest integrated blended learning model developed in this study. It covers core modules including overview, core framework, detailed operation guide, implementation conditions, common problems and solutions, as well as supporting appendices (templates, case library construction list, platform operation shortcuts). The manual is designed to provide actionable guidance for teachers to effectively implement the blended learning model, ensuring alignment with the "knowledge-skill-literacy" three-dimensional learning outcomes and enhancing students' autonomous learning and practical application abilities.

#### 1.2 Target Audience

1. Teachers of management majors at the School of Economics and Management, Pingdingshan University

2. University teachers offering practical courses such as Personnel Quality Assessment and Human Resource Management

3. Educators seeking to adopt "outcome-oriented + inquiry-driven" blended teaching

#### 1.3 Core Principles

1. Outcome-Based Education (OBE): All teaching links are backward-designed around preset learning outcomes to ensure a closed loop of "teaching-learning-assessment" alignment.

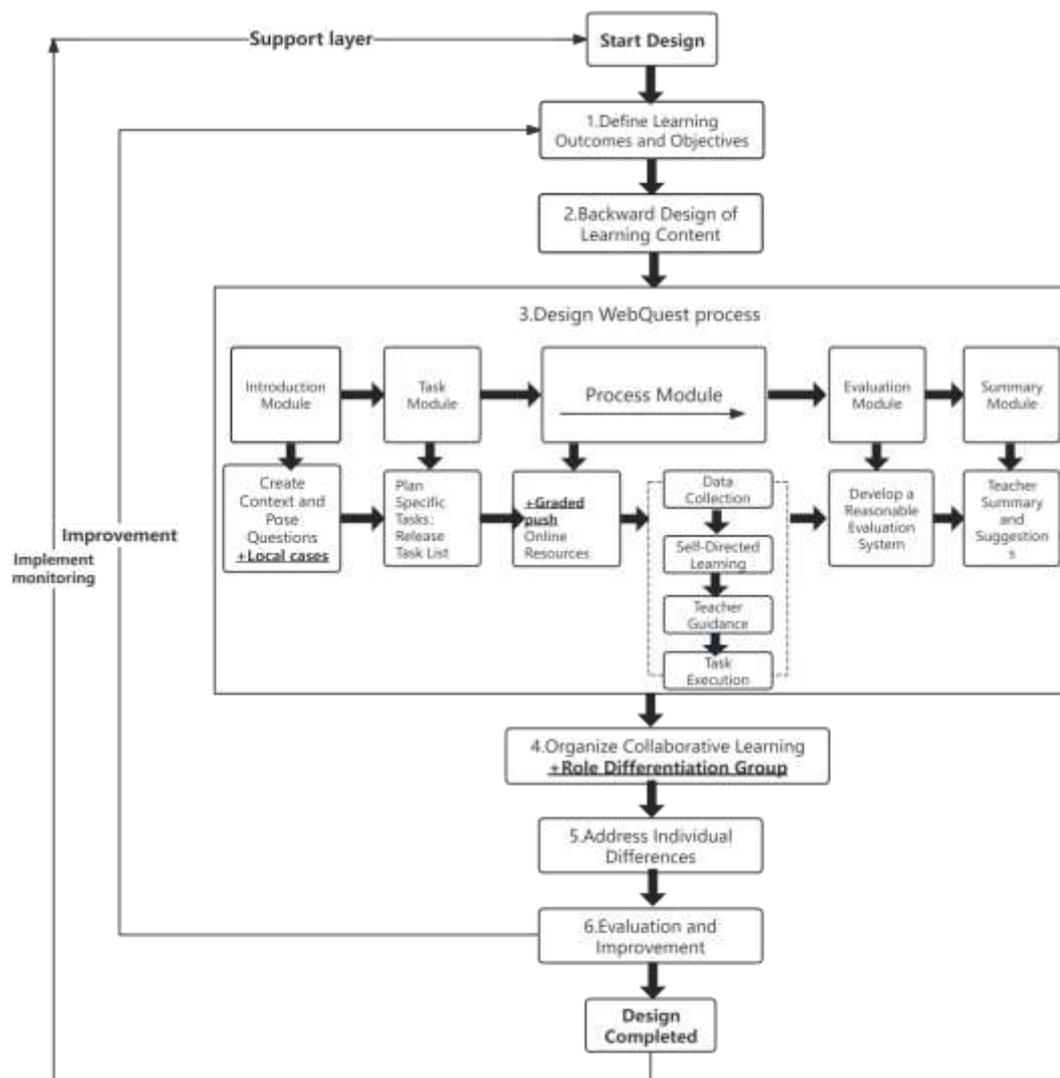
2. Inquiry-Driven (WebQuest): Centered on real situational tasks, stimulate active inquiry through "scenario-task-resources-collaboration".

3. Individual Adaptation: Cater to the needs of students with different foundations, providing hierarchical resources and personalized task options.

4. Synergistic Efficiency: Integrate the convenience of online platforms with the depth of offline interaction to strengthen knowledge application and teamwork capabilities.

## 2. Core Framework of the Model

The model consists of 6 core steps, forming a complete closed loop of "goal-design-implementation-assessment-optimization", with each step interlocking. The specific logic is as follows:



Key Supports: Weizhujiao Platform (core functions: hierarchical task push, three-dimensional assessment, resource distribution, data statistics) + Localized Case Resource Library + Multi-dimensional Assessment System.

### 3. Detailed Operation Guide

#### 3.1 Step 1: Clarify Learning Outcomes and Goals (Core Implementation of OBE)

##### Core Task

Based on the course positioning, determine quantifiable and assessable "knowledge-skill-literacy" three-dimensional learning outcomes, providing a clear direction for subsequent teaching design.

##### Specific Operations

###### 1. Outcome Decomposition

- Knowledge Goals: Focus on core concepts and theories. Example: For Personnel Quality Assessment, master the "application scenarios and operational principles of 5 types of assessment tools (written tests, interviews, assessment centers, etc.)".

- Skill Goals: Emphasize practical application abilities. Example: "Independently design position quality assessment plans (including tool selection, process design, and validity verification)".

- Literacy Goals: Balance professional ethics and thinking abilities. Example: "Possess assessment ethics awareness and be able to address talent assessment challenges under AI technology".

###### 2. Quantifiable Assessment Criteria

- Set observable indicators for each outcome. Example: The skill goal must meet "the plan includes more than 3 core assessment links, and the matching degree between tool selection and position needs  $\geq 80\%$ ".

- Refer to a "five-point scale" or hierarchical standards (Basic/Advanced/Challenging) to ensure assessability.

###### 3. Platform Release

- Log in to the Weizhujiao Platform, upload the three-dimensional outcomes and assessment criteria in the "Course Settings - Learning Goals" module.

Enable the "Goal Difficulty Adjustment Application" function, allowing students to apply for Basic/Advanced/Challenging level goals based on their own foundations, with teachers providing feedback within 1 working day.

#### Resource Preparation

Quantification Template for Learning Outcomes (including dimensions, outcome descriptions, assessment indicators)

Job Competency Demand Analysis Report corresponding to the course (integrating survey data from local enterprises in Pingdingshan)

#### Notes

Outcomes should be aligned with the practical needs of management majors, avoiding excessive abstraction (e.g., replace "master assessment theories" with "distinguish the advantages and applicable scenarios of 3 types of assessment tools").

Allow students to participate in goal negotiation to enhance learning initiative, but core outcomes shall not be lower than course standard requirements.

### 3.2 Step 2: Backward Curriculum Design (Derive Teaching Activities from Outcomes)

#### Core Task

Starting from the final learning outcomes, decompose module goals, design teaching content and activities, ensuring each link contributes to outcome achievement.

#### Specific Operations

##### 1. Module Division

- Split 18 teaching weeks based on the total course hours (36 hours recommended), with each module focusing on 1-2 sub-outcomes.

- Example: Module division for Personnel Quality Assessment: Assessment Basics → Tool Selection → Plan Design → Ethical Compliance → Comprehensive Practice.

##### 2. Activity Design

- Online Activities: Resource learning (videos/cases), online tests, group discussions, task submission.

- Offline Activities: Situational simulations, plan defenses, enterprise mentor comments.

- Ensure each activity corresponds to clear outcome sub-items. Example: "Online case analysis" corresponds to the sub-outcome of "distinguishing tool application scenarios".

### 3.Syllabus Compilation

- Clarify the "learning goals-core content-teaching activities-assessment methods" for each module.

- Mark the online/offline class hour allocation (recommended: theoretical modules: 20% online + 80% offline; practical modules: 40% online + 60% offline).

### Resource Preparation

Module Goal-Activity-Assessment Correspondence Template

Course Syllabus Framework (including OBE outcome mapping)

Localized Teaching Cases (e.g., recruitment assessment plans of local enterprises in Pingdingshan, competency models for management positions)

### Notes

Backward design should avoid "activity stacking"; each teaching activity must answer "how does this activity contribute to outcome achievement".

For practical modules, communicate with enterprise mentors in advance to ensure the authenticity and industry relevance of cases.

### 3.3 Step 3: Design WebQuest Tasks (Core of Inquiry-Driven Learning)

#### Core Task

Based on WebQuest's six components (Introduction, Task, Process, Resources, Evaluation, Conclusion), design real situational tasks to guide students in knowledge construction through independent inquiry and collaboration.

## Specific Operations

## 1.Component Decomposition and Implementation

WebQuest Component	Core Function	Weizhujiao Operation Path	Implementation Details
Introduction	Stimulate interest and clarify scenarios	Course Announcements/Discussion Area	Release localized real scenarios. Example: "Design a campus recruitment quality assessment plan for a technology company in Pingdingshan" with attached real job requirements from the enterprise.
Task	Clarify outcome deliverables	Assignment Module - Publish Tasks	Set specific deliverables. Example: "A complete assessment plan including tool selection explanation, process schedule, and scoring scale", marking the corresponding three-dimensional goals of the outcome.
Process	Provide inquiry scaffolding	Resource Center - Publish Guidelines	Decompose into 3-5 steps. Example: "1. Analyze job requirements → 2. Select assessment tools → 3. Design assessment processes → 4. Formulate scoring standards → 5. Optimize the plan", with operation tips for each step.
Resources	Provide inquiry support	Resource Center - Hierarchical Classification	Classify by "Basic/Advanced/Challenging": Basic Level (textbook chapters, tool manuals); Advanced Level (industry reports, enterprise cases);

WebQuest Component	Core Function	Weizhujiao Operation Path	Implementation Details
			Challenging Level (academic papers, cutting-edge tool operation videos).
Evaluation	Conduct multi-dimensional task assessment	Scoring Module - Set Rubrics	Adopt "automatic scoring + peer review + teacher scoring": Objective questions (e.g., tool selection correctness) are automatically scored; plan completeness is blindly reviewed by peers; innovation and practicality are jointly scored by teachers and enterprise mentors.
Conclusion	Guide reflection and summary	Discussion Area - Publish Topics	Raise reflective questions. Example: "What do you think is the most critical link in this plan design? How to optimize the adaptability of tool selection?"

## 2.Task Type Design

- Basic Tasks: Knowledge memory and understanding. Example: "Distinguish the applicable scenarios of structured and semi-structured interviews" (corresponding to knowledge goals).

- Comprehensive Tasks: Skill application and collaboration. Example: "Collaborate in groups to design a sales position assessment plan" (corresponding to skill goals).

- Extended Tasks: Literacy improvement and innovation. Example: "Analyze the ethical risks of AI assessment tools in enterprise applications" (corresponding to literacy goals).

### Resource Preparation

WebQuest Task Design Template (including mandatory items for six components)

Localized Case Library (e.g., Pang Donglai's recruitment assessment plan, job descriptions of technology companies in Pingdingshan)

Hierarchical Resource List (including resource type, access link, applicable goals)

### Notes

Task scenarios should be close to students' lives or the reality of local enterprises, avoiding abstraction.

Resources should be pre-screened and verified to ensure accessibility and relevance, reducing students' ineffective search time.

Process guidelines should be detailed but not rigid, leaving room for independent inquiry.

## 3.4 Step 4: Organize Collaborative Learning (Strengthen Interaction and Application)

### Core Task

Deepen inquiry effects through group collaboration, cultivate team communication and problem-solving abilities, and avoid the isolation of online learning.

### Specific Operations

#### 1. Group Design

- Grouping Method: Mixed-basis grouping (ensuring each group includes students with different foundations based on pre-diagnosis results).

- Intra-group Roles: Clarify role division (fixed + rotating). Example: "Demand Analyst (decompose job requirements), Tool Expert (select assessment tools), Process Designer (plan implementation steps), Plan Optimizer (revise and improve)".

- Weizhujiao Operation: Create groups through the "Group Management" module and publish role division instructions.

#### 2. Collaborative Task Design

- Online Collaboration: Use the Weizhujiao Discussion Area for asynchronous communication, share resources and initial ideas, with teachers replying to questions regularly (within 24 hours).

- Offline Collaboration: Arrange 6-8 offline seminar hours, focusing on plan integration and difficulty resolution, with teachers providing on-site guidance.

- Interaction Enhancement: Create a "Daily Quick Answer" question bank (including core knowledge points and case analysis questions for each module), organize group quizzes, and include points in formative evaluation.

### 3. Teacher Role Positioning

- Facilitator: Provide scaffolding questions when groups encounter difficulties. Example: "What are the core competencies of this position? Can existing tools cover them?"

- Provider of Feedback: Offer specific improvement suggestions for groups' phased outcomes, avoiding general evaluations.

Coordinator: Resolve conflicts in intra-group division of labor and ensure the participation of each member.

### Resource Preparation

Intra-group Role Division Instructions, Collaborative Task Scoring Rubric (including participation, contribution, and collaboration efficiency dimensions), Daily Quick Answer Question Bank Template (classified by module)

### Notes

Avoid "pseudo-collaboration": Ensure each student's participation through task decomposition and individual contribution records (Weizhujiao Group Log function).

Control group size: 4-6 students per group to ensure communication efficiency and feasibility of division of labor.

Teachers should regularly monitor the progress of online collaboration and promptly intervene in groups with passive participation.

### 3.5 Step 5: Address Individual Differences (Achieve Precision Adaptation)

#### Core Task

Provide flexible learning paths and resource support for students with different foundations and learning styles, ensuring all students can achieve core outcomes.

#### Specific Operations

##### 1.Pre-Diagnostic Assessment

- At the beginning of the course (Week 1), publish pre-diagnostic questions (including knowledge foundation, learning style, and autonomous learning ability) through the Weizhujiao "Quiz" module.

- Classify students into "Basic Group" (needing to strengthen knowledge memory), "Advanced Group" (needing to improve application ability), and "Challenging Group" (needing to expand innovative thinking) based on results.

##### 2.Hierarchical Support Design

Support Type	Basic Group	Advanced Group	Challenging Group	Weizhujiao Operation
Resource Push	Focus on textbook interpretations and basic tool manuals	Focus on case analyses and practical videos	Focus on cutting-edge research and innovative plan cases	Resource Center - Targeted push by tags
Task Selection	Compulsory basic tasks + optional comprehensive tasks	Compulsory comprehensive tasks + optional extended tasks	Compulsory extended tasks + self-designed tasks	Assignment Module - Publish optional task packages
Guidance Frequency	1 one-on-one basic Q&A per week	1 targeted feedback every two weeks	On-demand appointment for in-depth guidance	Private Message Function + Classified replies in Q&A Area

### 3. Learning Path Optimization

- Allow students to apply for level adjustment in the middle of the course (Week 9), with teachers reviewing based on formative performance.
- Generate personalized learning suggestions for each student using the Weizhujiao "Learning Report" function. Example: "Need to strengthen the application of 'assessment center tools'; it is recommended to supplement the 'unstructured group discussion practical video' in the Resource Center".

#### Resource Preparation

Student Pre-Diagnostic Questionnaire Template; Hierarchical Resource Tagging System (Basic/Advanced/Challenging and Knowledge/Skill/Literacy); Personalized Learning Suggestion Template

#### Notes

Hierarchical classification should be "invisible" to avoid labeling and protect students' self-esteem.

Core outcomes are uniformly required; hierarchy is only reflected in learning paths, resource difficulty, and extended tasks.

Regularly collect student feedback and dynamically adjust hierarchical resources and task design.

### 3.6 Step 6: Evaluate and Improve (Form Closed-Loop Optimization)

#### Core Task

Comprehensively monitor the achievement of learning outcomes through multi-dimensional assessment, and continuously optimize teaching design and implementation processes based on data feedback.

#### Specific Operations

##### 1. Assessment System Design

- Formative Evaluation (50% weight)

- Online Performance: Resource learning completion rate (20%), discussion area participation (10%), Daily Quick Answer points (10%)

- Offline Performance: Group collaboration contribution (5%), phased task completion quality (5%)

- Summative Evaluation (50% weight)

- Knowledge Assessment: Final online test (including 20 multiple-choice questions + 3 case analysis questions, 20% weight)

- Skill Assessment: Comprehensive practical plan (20% weight, jointly scored by teachers and enterprise mentors)

- Literacy Assessment: Ethics debate/plan defense performance (10% weight)

## 2.Data Collection and Analysis

- Weizhujiao Data: Export learning behavior data (resource access records, task completion time, test scores)

- Manual Records: Group collaboration observation logs, student reflection reports, teacher teaching logs

- Key Analysis Points: Outcome achievement rate (whether more than 80% of students meet core goals), link pain points (e.g., low completion rate of a module's tasks, low access to a type of resource)

## 3.Optimization Adjustments

- Immediate Adjustments (current week/current module): Quickly correct issues such as excessively high/low task difficulty and unavailable resources.

- Mid-term Adjustments (Week 9): Optimize task design and resource allocation for the second half of the course based on data from the first half.

- Long-term Adjustments (after course completion): Summarize successful experiences and shortcomings, update the case library, task templates, and assessment rubrics to provide improvement basis for the next round of teaching.

## Resource Preparation

Formative Evaluation Record Template

Summative Evaluation Scoring Rubric (divided into knowledge/skill/literacy dimensions)

Teaching Optimization Analysis Report Template

## Notes

Assessment should be highly aligned with learning outcomes, avoiding "assessing what is not taught".

Formative evaluation feedback should be timely (within 3 working days after task submission) to help students adjust learning strategies.

Invite students to participate in assessment system feedback, collecting suggestions on task rationality and resource applicability.

## 4. Implementation Conditions

### 4.1 Personnel Requirements

1. Familiar with Weizhujiao Platform operations, mastering OBE backward design logic, and having basic enterprise case integration capabilities.

2. Students: Possessing mobile devices (phones/tablets/computers) accessible to Weizhujiao, with basic autonomous learning awareness.

3. Support Personnel: Enterprise mentors (1-2 per course, responsible for case provision and plan comments), technical support (resolving platform operation issues).

### 4.2 Technical Support

1. Core Platform: Weizhujiao (required functions: group management, hierarchical task push, targeted resource distribution, automatic scoring, data export).

2. Auxiliary Tools: Tencent Meeting (online seminars), Excel (data statistics), shared documents (group collaboration).

3. Network Requirements: Stable campus network/home broadband supporting video learning and online submission.

#### 4.3 Resource Reserve

1. Localized Case Library: Recruitment assessment plans of local enterprises in Pingdingshan, job descriptions, industry reports (recommended to co-construct with enterprises such as Pingmei Group and Pang Donglai).

2. Hierarchical Resource Packages: Textbook chapters, practical videos, academic papers, and tool manuals classified by "Basic/Advanced/Challenging".

3. Template Toolkit: Task design templates, plan writing templates, assessment rubric templates, reflection report templates.

#### 5. Common Problems and Solutions

Common Problems	Solutions
Low online student participation, only completing compulsory tasks	1. Optimize task scenario design to enhance localization and interest; 2. Establish an "Inquiry Star" incentive mechanism to recognize students who take initiative in extended learning; 3. Simplify online operation processes to reduce unnecessary clicks.
"Free-rider phenomenon" in group collaboration	1. Clarify requirements for individual contribution records (e.g., group logs must mark each member's division of labor); 2. Adopt "individual + group" two-dimensional scoring, with individual contribution accounting for no less than 30%; 3. Teachers regularly spot-check group collaboration process records.
Basic group students still find resources too difficult after hierarchical resource push	1. Refine pre-diagnostic indicators to ensure accurate stratification; 2. Supplement "prerequisite knowledge" resource packages for the basic group; 3. Arrange paired assistance between advanced group and basic group students (included in collaboration scoring).
Insufficient participation of enterprise mentors, unable to comment on plans in a timely manner	1. Agree on comment time nodes in advance (e.g., centralized comments once every 2 weeks); 2. Adopt an "online asynchronous comment" mode, with enterprise mentors providing feedback via Weizhujiao messages; 3. Select 1-2 core plans for in-depth comments, and provide general suggestions for the rest.
Weizhujiao Platform functions cannot meet hierarchical task push needs	1. Manually classify students and resources using the platform's "tag" function; 2. Contact the technical team to activate customized functions; 3. Use WeChat groups as auxiliary to distribute tasks and resources by level.

## Research Profile

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