



# Application and Practice of BOPPPS Teaching Model in Postgraduate Academic English Courses at Guilin Medical University under the OBE Concept

Liao Wenqi<sup>1</sup>, Liang Xueqing<sup>1</sup>

<sup>1</sup>Guilin Medical University, Guilin, China  
Email: [liao\\_wenqi@yeah.net](mailto:liao_wenqi@yeah.net)

**Abstract:** Against the backdrop of the New Medical Science Initiative, cultivating medical postgraduates with international research communication competence is central to medical education reform. As a core compulsory course, Academic English prepares postgraduates for foreign-language literature reading, SCI paper writing and international academic exchanges. Nevertheless, it suffers from vague teaching objectives, insufficient classroom interaction, theory-practice disjunction and oversimplified assessment. Conventional lecture-based teaching fails to meet the practical English output demands of medical research talents. Guided by Outcome-Based Education (OBE), this study adopts the closed-loop six-phase BOPPPS model. Drawing on teaching practices for Pharmacy and Public Health postgraduates at Guilin Medical University, it develops an innovative academic English teaching system featuring online-offline integration, whole-process pre-to-post-class arrangement, and collaboration between the first and second classrooms. Through action research and controlled experiments, we restructure teaching objectives, design tiered content, deploy Rain Classroom-iTest dual online platforms, and apply a diversified assessment scheme with formative and summative evaluations each weighted at 50%. Practical data show that the OBE-BOPPPS experimental group achieves significantly better results than the control group in course participation, medical-English literacy, academic presentations and final scores. This model alleviates the over-emphasis on theory rather than practical output and provides a replicable paradigm for postgraduate public foreign-language reform in local medical universities.

**Keywords:** Outcome-Based Education (OBE), BOPPPS teaching model, medical postgraduates, Academic English, New Medical Science Initiative, blended teaching

## Introduction

### 1.1 Background Policy of the Research

In 2020, the General Office of the State Council issued the Guiding Opinions on Accelerating the Innovation-Driven Development of Medical Education, which clearly takes the “New Medical Science” initiative as the guideline for medical education innovation and puts forward the talent-training objective of cultivating high-level medical professionals proficient in international rules and equipped with international research competitiveness<sup>[1]</sup>. Meanwhile, the 13th Five-Year Plan and 14th Five-Year Plan for the Development of Degree and Postgraduate Education both emphasize that postgraduate education should strengthen the cultivation of international academic competence and foster postgraduates’ core competencies including reading foreign-language literature, publishing academic papers and conducting cross-border academic exchanges<sup>[2]</sup>. As a compulsory public basic course for medical postgraduates, Academic English serves as a bridge connecting medical professional knowledge with cutting-edge international research. Its teaching effectiveness directly determines the ceiling of medical postgraduates’ research output and international communication capacity.

### 1.2 Context of the Research

At present, domestic medical universities offer the Academic English course for both academic-oriented and professional-oriented master’s students. Nevertheless, the traditional lecture-based “teacher-centered” mode has long been adopted. Teaching content is disconnected from clinical and research scenarios; teaching objectives are not oriented toward students’ research-competence outputs; assessment mainly relies on final written examinations while ignoring holistic learning progress. Consequently, numerous postgraduates encounter the dilemma of decoupling between learning and practice: they can recognize individual words yet fail to comprehend academic literature; they are capable of writing isolated sentences but cannot construct frameworks for medical research papers. Such conditions fail to satisfy the training requirements for compound-talented professionals under the New Medical Science initiative.

Outcome-Based Education (OBE) adheres to three core principles: student-centeredness, outcome orientation and continuous improvement<sup>[3]</sup>. It advocates reverse design of teaching systems based on occupational and research-competence demands. The BOPPPS model is a standardized closed-loop participatory classroom tool consisting of six phases: Bridge-in (B), Objectives (O), Pre-assessment (P1), Participatory learning (P2), Post-assessment (P3), and Summary (S). Natural coupling and compatibility exist between the two approaches. Based on postgraduate teaching practices at Guilin Medical University, this study embeds the top-level design logic of OBE into the complete BOPPPS classroom workflow. It constructs an integrated teaching chain by leveraging Rain Classroom and iTest online platforms,



supplemented by second-classroom expansion activities, so as to explore feasible reform paths of Academic English tailored for medical postgraduates.

## **Literature Review**

### **2.1 Review of Domestic Research Status**

Domestic scholars have yielded abundant research outcomes concerning medical Academic English, the OBE philosophy and the BOPPPS teaching model<sup>[4]</sup>. Driven by the New Medical Science Initiative, numerous medical universities have recognized that postgraduate Academic English undertakes the vital function of fostering students' capabilities in foreign-language literature reading, SCI-paper writing and international academic communication. Traditional lecture-dominated teaching suffers from the disconnection between knowledge acquisition and practical application as well as simplistic assessment approaches. Many scholars have explored curriculum optimization from perspectives such as blended teaching and outcome-oriented instruction, aiming to address the long-standing dilemma of "emphasizing linguistic knowledge while neglecting research-oriented output".

As an outcome-oriented educational paradigm, OBE has been widely adopted in medical curriculum reform. It advocates reverse design of teaching objectives, content and assessment schemes according to graduates' expected competencies, and provides top-level thinking for medical courses. Featuring six phases of Bridge-in, Objectives, Pre-assessment, Participatory Learning, Post-assessment and Summary, the closed-loop participatory BOPPPS model can effectively improve classroom interaction. It has been extensively implemented in undergraduate medical courses such as clinical medicine and experimental courses and proven to boost class engagement and learning performance.

Existing studies have attempted to integrate OBE with BOPPPS for medical teaching reform and verified their theoretical compatibility. OBE undertakes macro-level curriculum design while BOPPPS realizes micro-level classroom implementation, translating outcome-oriented ideas into instructional practices. Nevertheless, literature review reveals that most empirical studies target undergraduate medical students, with limited practical cases for professional master's students majoring in Pharmacy and Public Health. Some studies merely superimpose the two models without well-designed online-offline linkage covering pre-class, in-class and after-class stages. Complete practical solutions for collaborative education between the first and second classrooms and diversified formative assessment systems remain insufficient. Controlled reform studies specifically focusing on postgraduate Academic English in local medical universities are still scarce, which creates research space for the present study<sup>[5][6]</sup>.

Existing studies exhibit three major limitations. First, most relevant researches target undergraduate medical students, while empirical evidence for professional master's students in Pharmacy, Public Health and other disciplines remains insufficient. Second, OBE concept and the BOPPPS model are often simply superimposed in existing studies, lacking linked design of online carriers for pre-class and after-class sessions. Third, complete practical schemes for collaborative education integrating the first and second classrooms are scarce, and the design of assessment systems is relatively rudimentary.

### **2.2 Review of International Research Status**

Overseas applications of OBE and BOPPPS are mostly concentrated in engineering and teacher-training disciplines. There are few localized empirical studies on Academic English for medical postgraduates, and few implementable teaching frameworks adapted to the learning context of domestic medical universities. Given the above-mentioned research gaps, grounded in the reality of postgraduate teaching at local medical universities, this study constructs a complete integrated BOPPPS teaching system under the OBE perspective and carries out one-cycle controlled teaching practice, so as to compensate for the shortage of practical cases and empirical data in existing teaching-reform researches.

### **2.3 Research Value**

#### **2.3.1 Theoretical Value**

This study clarifies the internal coupling logic between outcome-oriented OBE philosophy and the closed-loop BOPPPS classroom model. It enriches the theoretical system of postgraduate public foreign-language teaching under the New Medical Science Initiative, and improves the theoretical framework for medical Academic English regarding tiered teaching, dual-line collaborative education and multi-dimensional assessment.

#### **2.3.2 Practical Value**

It produces deliverables including a practical syllabus for Academic English for Medical Postgraduates, a full set of courseware, an online teaching task library, and second-classroom activity schemes. These outcomes provide a promotable teaching-reform template for Guangxi and other similar local medical universities. Meanwhile, it helps improve teachers' capabilities in blended-teaching design and outcome-based curriculum development, as well as enhances postgraduates' core research-related English competencies: medical English literature reading, SCI-paper writing, and international academic presentation.

### **2.4 Core Concepts and Coupling Logic**

#### **2.4.1 Core Connotation of the OBE Educational Philosophy**

Outcome-Based Education (OBE) follows the core logic of reverse design, forward implementation and cyclic improvement. Firstly, it defines the core competencies students are expected to achieve upon graduation. In medical contexts, such competencies include intensive reading of foreign-language literature, medical paper writing, academic interpretation and medical-terminology translation. Secondly, it reversely decomposes three-dimensional teaching objectives covering knowledge, skills and literacy. Thirdly, it restructures tiered teaching content and selects appropriate teaching approaches. Fourthly, it establishes a whole-process assessment mechanism aligned with expected learning outcomes, and continuously optimizes curriculum design based on assessment feedback. Different from the traditional textbook-centered and teacher-centered model, all teaching activities under OBE are oriented toward students' implementable and testable research-related English output competencies<sup>[7]</sup>.

2.4.2 Composition of the BOPPPS Teaching Model

BOPPPS is a standardized closed-loop participatory classroom model with six interrelated functional phases:

**B (Bridge-in):** Motivates students by introducing medical research cases and cutting-edge literature-related questions.

**O (Objective):** Clearly presents three-dimensional learning outcomes of knowledge, skills and literacy for the current class.

**P1 (Pre-assessment):** Conducts pre-class online tests to identify students' weak points in preview.

**P2 (Participatory Learning):** Carries out active-learning activities such as group discussions, case analysis and rewriting excerpts of research papers.

**P3 (Post-assessment):** Adopts in-class mini-tasks to examine the achievement of classroom-learning outcomes.

**S (Summary):** Sort out key and difficult points and assign tiered after-class extension tasks.

The core strength of this model lies in its emphasis on student participation throughout the session. Pre-assessment and post-assessment deliver instant feedback on classroom effects and form a complete closed-loop for individual lessons.

2.4.3 Internal Coupling Logic between OBE and BOPPPS

OBE provides a macro top-level curriculum framework that addresses “what to teach” and “what competencies should be ultimately cultivated”. BOPPPS serves as a standardized micro-level implementation tool for individual classes to answer “how to realize teaching objectives in each session”. Together they build a complete macro-to-micro teaching chain.

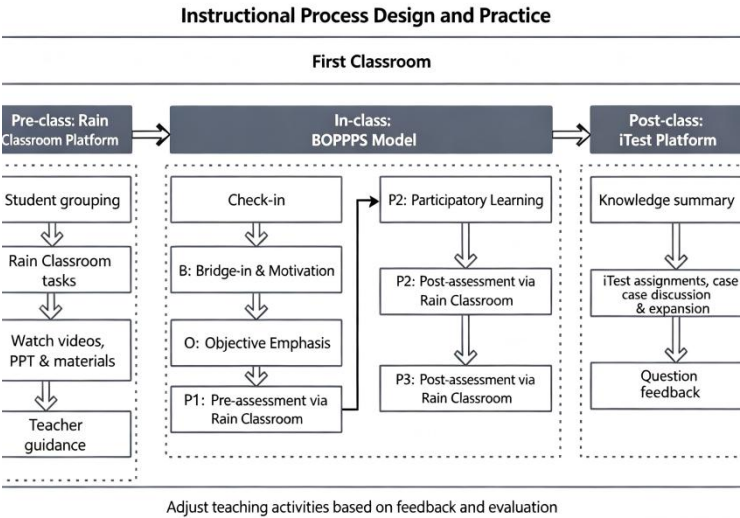
- 1. The overall learning outcomes decomposed reversely by OBE are broken down into granular classroom objectives for each phase within the BOPPPS framework.
- 2. Pre-assessment and post-assessment data from BOPPPS offer process-oriented learning-evidence for OBE-driven continuous improvement.
- 3. The participatory-learning phase of BOPPPS materializes the student-centered educational requirement of OBE.
- 4. The holistic multi-dimensional assessment system covers both outcome verification for OBE and performance evaluation for each BOPPPS classroom phase.

The integration of the two approaches overcomes the limitations of applying either teaching tool alone, and realizes outcome-oriented governance spanning from top-level curriculum design to the practical delivery of individual classes.

Methodology

3.1 Holistic Design of the Integrated OBE-BOPPPS Teaching System

Drawing on teaching resources for professional master’s students majoring in Pharmacy and Public Health (cohorts 2024-2025) at Guilin Medical University and considering the learning profiles of 120 full-time postgraduates, this study constructs a complete teaching system consisting of OBE top-level design -- online pre-class preparation -- offline BOPPPS classroom sessions -- online after-class consolidation -- second-classroom expansion -- multi-dimensional assessment -- iterative optimization. The overall framework is illustrated in the following figure.



3.1.1 Reverse Reconstruction of the Curriculum System Based on OBE

### 1.Three-Dimensional Course Outcome Objectives

Aligned with the talent-training requirements of the New Medical Science Initiative, the expected course outcomes are defined from three dimensions: knowledge, skills, and literacy.

1) Knowledge Objectives: Master core medical academic vocabulary, standard structures of English research papers, fixed expressions for medical abstracts, introductions, results and discussions, as well as presentation norms for international medical conferences.

2) Skill Objectives: Independently conduct intensive reading of SCI medical literature; finish abstract translation and first-draft writing for medical papers; deliver 3-5-minute English presentations on medical topics.

3) Literacy Objectives: Establish rigorous research norms, develop cross-cultural perspectives on Chinese-foreign medical comparisons, tell Chinese medical stories in English, and cultivate the spirit of the Red Medical Ethos.

### 2. Three-Tier Modular Teaching Content

Following the standards of “high-depth, innovative and challenging curriculum”, the course is divided into three progressive content modules:

1) Basic Introductory Tier: Medical academic vocabulary, basic sentence patterns for literature, fundamental reading and writing of English abstracts.

2) Competence-advancement Tier: Full-framework writing of medical papers, in-depth reading of clinical and public-health-related literature, long-text translation.

3) Comprehensive Expansion Tier: International conference presentations, English presentations for medical research projects, international communication of Chinese medical achievements.

### 3. “Four-Integration” Teaching Implementation Strategies

Four integrated strategies are adopted for the first-classroom teaching: integration of online-offline blended teaching; whole-process connection covering pre-class, in-class and after-class phases; diversified case-based and task-driven teaching methods; integration of domain-specific English and curriculum-based ideological and political education. Two featured practical activities are designed for the second classroom: the Medical Academic Literature Translation Contest and the “Tell China’s Stories” English Speech Contest, so as to connect competence cultivation both inside and outside the classroom.

#### 3.1.2 Offline Classroom: Implementation of Standardized Six-Phase Closed-Loop BOPPPS Model

The six phases are fully carried out in offline physical classrooms, with all activities centered on research-oriented medical English tasks:

1. **Bridge-in (B):** Two introduction approaches are adopted: question-driven introduction and clinical research case introduction. For example, practical questions such as “Why do English abstracts written by domestic medical researchers fail to comply with SCI standards?” are raised to stimulate postgraduates’ thinking.

2. **Objectives (O):** Quantifiable learning outputs of the session are clearly presented via PPT, such as “Master three sentence patterns for data description in the Results section and complete the English rewriting of a paragraph of clinical data”.

3. **Pre-assessment Review (P1):** Focused intensive lectures are delivered targeting common errors identified from Rain Classroom previews to tackle students’ knowledge blind spots.

4. **Participatory Learning (P2):** Task-driven activities including group revision of medical paper excerpts, peer evaluation of translated literature paragraphs, and simulated academic presentations are organized to engage all learners. Teachers provide roaming guidance and timely error correction.

5. **Post-assessment (P3):** In-class micro output tasks, such as drafting a paragraph of medical conclusions within 10 minutes, are arranged to instantly inspect the achievement of learning objectives.

6. **Summary (S):** Sort out the medical English writing logic covered in class, recommend extended extracurricular literature resources, and assign tiered after-class consolidation tasks.

#### 3.1.3 iTest Platform: After-class Consolidation and Outcome Extension

The iTest online platform supports the review of P3 post-assessment and extended exercises after class:

1. Assign tiered homework related to medical literature reading and academic paper writing;

2. Build a case discussion section for students to share and exchange their in-class outputs;

3. Automatically archive all students’ online learning data, which serves as primary evidence for formative assessment;

4. Students submit translation and writing assignments online, and teachers provide annotated feedback digitally, forming a closed loop for continuous after-class learning.

#### 3.1.4 Collaborative Education Design for the Second Classroom

To make up for the limited class hours of the first classroom, two regular second-classroom activity platforms are established:

1. Academic English Literature Translation Activity: Regular translation competitions of medical reviews and clinical research papers are held to cultivate students’ proficiency in long-text professional translation.

2. “Tell China’s Stories” English Speech Activity: English speeches themed on Chinese achievements in traditional Chinese medicine, primary healthcare and public health. This activity integrates curriculum-based ideological and political education and develops students’ international communication literacy simultaneously.

### 3.15 Integrated Multi-dimensional Assessment Mechanism

In accordance with the OBE requirement of continuous improvement, a dual-track assessment system is established, consisting of formative assessment (50%) and summative assessment (50%), which abandons the assessment mode dominated by a single final examination:

1. Formative Assessment (50%): Scoring items include the completion rate of preview tasks on Rain Classroom, class attendance and participation, presentations of group assignments, peer evaluation, online assignments finished on iTest, and participation performance in second-classroom activities.

2. Summative Assessment (50%): The comprehensive final written examination accounts for 50% of the total course grade, comprising a 70% closed-book segment and a 30% open-book segment. The closed-book test covers medical professional terminology, medical passage reading comprehension, English-to-Chinese translation of medical sentences, and English composition, whereas the open-book test focuses on translating high-quality English academic papers. It comprehensively evaluates students' research-oriented English application competence.

All assessment data are utilized for teaching reflection to iteratively optimize curriculum design, teaching content and classroom activities for subsequent teaching cycles.

## 3.2 Research Subjects and Research Methods

### 3.2.1 Research Subjects

A total of 120 professional master's students majoring in Pharmacy and Public Health (2024–2025 cohorts) from Guilin Medical University were recruited and randomly assigned to either the control group (60 students) or the experimental group (60 students). The control group received conventional lecture-based instruction dominated by offline textbook teaching and a single final examination, without online preview arrangements, interactive group tasks, or second-classroom supportive activities. In contrast, the experimental group was delivered the integrated OBE-BOPPPS blended teaching system constructed in this study. To ensure experimental rigor and single-variable controllability, both groups adopted identical syllabi, teaching materials, and instructors throughout the whole semester (96 standard class hours). All instructors held formal FDW and ISW teaching certification, with systematic BOPPPS training experience and long-term expertise in medical postgraduate Academic English teaching, which effectively eliminated teacher-related confounding variables.

### 3.2.2 Research Methods

This study adopted a mixed-method research framework combining action research, controlled experimentation, questionnaire surveys, and semi-structured interviews. Specifically, action research was implemented to support iterative curriculum design, in-class teaching delivery, outcome assessment, and teaching optimization. A between-group controlled experiment was conducted to compare students' overall academic performance and dimensional core competence before and after the intervention. A post-course questionnaire survey and one-on-one semi-structured interviews were further utilized to collect subjective learning perceptions, classroom engagement status, and personalized feedback, so as to complement and validate the quantitative experimental results.

### 3.2.3 Implementation Details of Questionnaire and Interview Research

To guarantee the transparency, reproducibility, and methodological completeness of the mixed-method data, all questionnaire and interview procedures were strictly standardized in terms of instrument design, data collection, technical verification, and qualitative analysis. The self-designed post-course questionnaire focused on three core dimensions: classroom task targeting and participation willingness, in-class learning concentration, and autonomous pre-class learning initiative. All items were measured with a standard 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), covering representative statements regarding task suitability, classroom participation, learning focus, and autonomous preview behavior. To ensure rigorous validity and reliability, the questionnaire was revised and examined by three university English teaching supervisors and two medical education experts to confirm qualified content validity. Exploratory factor analysis further verified acceptable structural validity, with all items appropriately loaded on the predefined dimensions. The overall Cronbach's  $\alpha$  coefficient of the questionnaire reached 0.892, indicating excellent internal consistency. In this study, 120 questionnaires were distributed and all validly retrieved, achieving a valid response rate of 100% with no invalid samples excluded.

Semi-structured interviews were conducted with 10 randomly selected students from each group, centering on perceived teaching differences, learning outcome changes, formative assessment effects, practical task support for academic writing and literature reading, and feasible teaching optimizations. All interviews were carried out in a quiet, independent discussion room with participants' verbal informed consent. The whole interviewing process was digitally recorded completely without real-time missing records. Within 24 hours after each interview, verbatim textual transcription was completed, with repetitive and irrelevant content removed. All transcribed manuscripts were double-checked by two independent researchers to ensure textual accuracy and completeness. For qualitative analysis, inductive thematic analysis was adopted throughout the coding procedure. The research team firstly performed open coding to extract original viewpoints and key statements, followed by axial coding to categorize core themes including learning initiative transformation, classroom task adaptability, academic competence improvement, and existing teaching deficiencies. Finally, selective coding was conducted to refine the internal mechanism of the OBE-BOPPPS teaching intervention effect, forming systematic and credible qualitative conclusions.

Representative participant quotations were extracted to intuitively reflect authentic learning experiences. Experimental group students generally affirmed the advantages of the optimized teaching model: "The pre-class preview tasks help me clarify key learning points in advance, and the in-class group revision of medical abstracts and SCI excerpts makes me clearly realize my weaknesses in academic writing. Continuous formative evaluation makes me keep learning steadily instead of cramming before final exams." Another typical feedback stated that "The teaching tasks are closely connected

with real medical research scenarios, which greatly improves my confidence and practical ability in reading literature and writing academic papers.” In comparison, control group students reflected the limitations of traditional lecture-based teaching: “Most classroom teaching focuses on vocabulary and grammar explanation. There are few practical writing and translation exercises related to medical research. I still cannot write a qualified medical English abstract independently after finishing the course.”

## Results

### 4.1 Comparison of Practical Teaching Effects

#### 4.1.1 Final Examination Performance

To ensure rigorous and comparable outcome measurement between the experimental and control groups, inter-group comparisons relied on raw final-examination scores instead of composite course grades. Both groups completed the identical summative final written examination, which accounted for 50% of the total course grade and comprised a 70% closed-book component and a 30% open-book component. The closed-book section included four modules with fixed full scores: medical professional terminology (45 points), reading comprehension of medical passages (20 points), English-to-Chinese translation of medical sentences (15 points), and English composition (20 points). The open-book section assessed the translation of high-quality English academic papers. All exam papers were anonymized with marker blinding to eliminate subjective scoring bias.

Independent-samples t-tests revealed statistically significant group differences in the overall score and all sub-dimensional indicators (all  $P < 0.001$ ). The experimental group achieved a significantly higher overall final score ( $82.7 \pm 5.2$ ) than the control group ( $69.3 \pm 6.8$ ), with a large effect size (Cohen’s  $d = 2.21$ ). Detailed quantitative results are presented in Table 1. Sub-dimensional analysis showed that the experimental group outperformed the control group by 16 points in the total closed-book score; the largest single-item gap was found in medical professional terminology (6.3-point difference), followed by English composition (4.4-point difference). The experimental group also obtained a 7.3-point advantage in open-book academic-paper translation. These results indicate that the OBE-BOPPPS intervention effectively improves medical postgraduates’ comprehensive research-oriented English application competence covering terminology, reading, translation and writing.

Table 1. Quantitative outcome comparison between the experimental group and control group

| Evaluation Indicators                                      | Experimental Group | Control Group | Statistical Results                      |
|------------------------------------------------------------|--------------------|---------------|------------------------------------------|
| Overall final examination score (M±SD)                     | 82.7±5.2           | 69.3±6.8      | t-test, $P < 0.001$ , Cohen’s $d = 2.21$ |
| Closed-book total score (M±SD)                             | 86.0±4.8           | 70.0±6.2      | t-test, $P < 0.001$ , Cohen’s $d = 2.33$ |
| └ Medical professional terminology (M±SD)                  | 40.5±3.1           | 34.2±4.2      | t-test, $P < 0.001$                      |
| └ English composition (M±SD)                               | 15.5±2.0           | 11.1±2.4      | t-test, $P < 0.001$                      |
| Open-book translation score (M±SD)                         | 75.0±5.5           | 67.7±7.1      | t-test, $P < 0.001$ , Cohen’s $d = 1.18$ |
| Active classroom participation rate                        | 91.7%              | 38.3%         | Chi-square test, $P < 0.001$             |
| In-class distraction & insufficient pre-class preview rate | 13.3%              | 76.7%         | Chi-square test, $P < 0.001$             |

#### 4.1.2 Classroom Engagement and Learning Initiative (Questionnaire Data)

Questionnaire data was adopted to evaluate students’ classroom engagement and autonomous learning initiative. Chi-square test was applied to examine inter-group differences in learning behavioral indicators, and the relevant quantitative results are presented in Table 1. Statistical data showed that the experimental group with OBE - BOPPPS teaching achieved substantially better learning engagement than the control group with traditional lecture-based teaching. In the experimental group, 91.7% of students recognized the targeted design of classroom tasks and actively participated in group discussions, while only 13.3% of students had problems with in-class distraction and inadequate pre-class preparation. In contrast, the control group exhibited insufficient autonomous learning awareness: merely 38.3% of students took the initiative in classroom interaction, and the vast majority (76.7%) failed to develop regular pre-class preview habits. The distinct inter-group differences confirm that the OBE - BOPPPS model can effectively activate students’ learning motivation and improve overall classroom learning efficiency.

#### 4.1.3 Student Interview Outcomes

Qualitative interview outcomes further complement and validate the above quantitative results, forming mixed-method evidence to support the effectiveness of the OBE-BOPPPS teaching intervention. Postgraduates in the experimental group generally affirmed the rationality and practicality of the optimized teaching framework. They reported that online pre-class preview clarified learning priorities, in-class manuscript revision activities closely fit authentic SCI paper writing scenarios, and the whole-process formative assessment mechanism eliminated passive cramming before examinations, enabling continuous improvement in academic literature reading and medical English writing abilities. By comparison,

students in the control group stated that traditional teaching focused excessively on basic vocabulary and grammar instruction, lacking practical tasks related to real medical research. Such theoretically oriented teaching failed to cultivate students' practical academic English application capacity, leaving most students unable to write qualified medical English abstracts after course completion.

## **4.2 Improvement of Teachers' Professional Teaching Competence**

Relying on the proposed teaching model, the research team has carried out collective lesson preparation, teaching case development and online resource construction. This practice drives teachers to fully explore the practical English demands of medical scientific research and design tiered teaching resources in a reverse outcome-oriented manner. Team members have won multiple awards in university-level and provincial-level teaching competitions and completed the development of supporting resources for the first-class medical English course. Accordingly, teachers' comprehensive capabilities in curriculum design, blended teaching and outcome-based teaching research have been significantly improved.

## **Discussion**

### **5.1 Research Findings and Comparative Analysis with Existing Studies**

Consistent with existing scholarship, prior educational studies confirm that standalone BOPPPS frameworks effectively improve student participation and mitigate the limitations of traditional teacher-centered lecturing, while the OBE philosophy provides systematic outcome-oriented guidance for curriculum design and iterative teaching optimization<sup>[3]</sup>. Furthermore, previous medical English reform research validates that outcome-based and participatory instructional designs bridge the gap between theoretical language acquisition and practical academic research application<sup>[4]</sup>.

Nevertheless, the present study delivers targeted supplements and innovative improvements relative to existing literature. Most prior empirical studies focus primarily on undergraduate medical students or simply combine OBE and BOPPPS theories without constructing a complete, closed-loop teaching system covering pre-class, in-class, and after-class procedures<sup>[5]</sup>.

### **5.2 Internal Mechanism of OBE-BOPPPS Integrated Model for Improving Learning Outcomes**

The superior instructional effectiveness of the proposed teaching system derives from the complementary coupling of multiple reform components and standardized instructional logic, instead of the isolated contribution of the BOPPPS model. The underlying improvement mechanism can be elaborated from three systematic dimensions. First, the OBE concept establishes top-down, outcome-oriented guidance for the entire curriculum system. Different from conventional textbook-centered instruction, OBE reversely decomposes core research-oriented competencies, including SCI literature comprehension and medical paper writing, ensuring that all instructional content and task design align closely with the authentic academic demands of medical postgraduates and effectively resolve the disconnection between language learning and research practice.

Second, the standardized six-phase BOPPPS closed-loop framework serves as a feasible micro-level implementation tool to translate macroscopic outcome goals into in-class instructional practices. The sequential procedures of bridge-in, objective clarification, pre-assessment, participatory learning, post-assessment, and summary effectively address the deficiencies of traditional teaching, including ambiguous classroom objectives, insufficient student involvement, and inadequate in-class outcome detection, thereby achieving precise and efficient instructional output. Third, the collaborative support of online teaching platforms, diversified formative assessment, and second-classroom activities constructs a holistic closed-loop instructional system covering the entire learning cycle. Online platforms facilitate personalized pre-class preparation and targeted post-class consolidation; the 50/50 formative-summative dual assessment mechanism eliminates the limitations of single final-exam evaluation and sustains continuous learning; extracurricular academic activities further consolidate students' practical academic English application competence.

Collectively, the collaborative operation of OBE-driven curriculum design, BOPPPS-based classroom implementation, online platform support, full-cycle multi-dimensional assessment, and second-classroom expansion jointly promotes the comprehensive improvement of students' learning initiative and academic English competencies, which constitutes the core mechanism underlying the effectiveness of the proposed instructional intervention.

### **5.3 Limitations of the Study**

This study preliminarily confirms the positive comprehensive effects of the multi-element OBE-BOPPPS integrated teaching system on medical postgraduates' academic English learning. Nevertheless, several inherent limitations exist in the current research due to objective experimental constraints. First, this study adopts a single-institution, single-semester exploratory design that exclusively targets Pharmacy and Public Health professional postgraduates from a local medical university. The available empirical evidence is insufficient to support exaggerated claims of universal replicability, generalized teacher competency promotion, extensive international communication improvement, or widespread applicability across diverse educational contexts. Accordingly, the research findings should be interpreted as preliminary exploratory results rather than universal conclusions.

Second, this instructional intervention inevitably contains potential confounding factors and systematic biases. The instructor effect cannot be fully eliminated, as all teaching practices are implemented by fixed instructors with mature curriculum design capabilities, which may positively influence classroom performance and learning outcomes. Third, questionnaire and interview data rely on students' subjective self-perception, which inherently generates self-report bias and may overestimate individual learning gains and instructional satisfaction. Fourth, the research scope excludes clinical and basic medical postgraduates, and the short-term intervention cycle fails to capture long-term learning effects, thereby limiting the generalizability of the proposed model to broader student groups and multi-semester instructional scenarios.

#### 5.4 Continuous Improvement and Future Research Directions

To address the aforementioned limitations and further validate the stability and robustness of the integrated teaching intervention, targeted optimizations and follow-up research will be conducted in future studies. First, subsequent research will expand the participant scope to include clinical medicine and basic medicine postgraduates and carry out multi-semester and multi-institution trials to further verify the model's replicability and disciplinary adaptability. Second, objective long-term indicators, such as academic output and paper publication performance, will be incorporated to reduce reliance on subjective self-reported data and mitigate self-report bias. Third, multiple teaching teams will be involved in model implementation to control instructor effects and enhance the objectivity of experimental results. Fourth, discipline-specific tiered teaching resources will be developed to improve the pertinence and popularization potential of the blended teaching system across diverse medical majors.

#### Conclusion

Against the backdrop of the New Medical Science Initiative and high-quality postgraduate education reform, conventional lecture-based Academic English teaching fails to satisfy the research-oriented output demands of modern medical postgraduate training. This study constructs a multi-dimensional blended teaching system guided by the OBE concept and grounded on the closed-loop BOPPPS classroom framework, incorporating online auxiliary instruction, full-cycle formative assessment, and first-and-second-classroom collaborative education. Through controlled empirical experimentation, this preliminary exploratory practice verifies that the compound teaching reform effectively enhances students' classroom participation, autonomous learning ability, and core academic English competencies in medical literature reading and manuscript writing, while facilitating the iterative optimization of teachers' outcome-oriented curriculum design and blended teaching capabilities within the current research context.

This study explicitly clarifies that the improved instructional effectiveness originates from the synergistic effects of multiple reform components, rather than the standalone contribution of the BOPPPS model. Given the single-institution and single-semester research design, the proposed teaching scheme delivers favorable practical operability and preliminary replicable potential for local medical universities, without possessing universal applicability. This research provides a tentative and feasible reform reference for postgraduate Academic English teaching in regional medical colleges with similar educational conditions. Further large-scale, long-term empirical verification is essential to support the generalized promotion and systematic optimization of the integrated teaching model.

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