Trends in Social Sciences and Humanities Research
Print ISSN: 2959-992X
Online ISSN: 2959-9938
DOI: https://doi.org/10.61784/tsshr3216

INTEGRATING BOPPPS AND OBE TO FOSTER PRACTICAL AND INNOVATIVE COMPETENCE IN MASTER OF NURSING SPECIALIST STUDENTS: A CASE STUDY OF THE ADVANCED HEALTH ASSESSMENT COURSE

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Abstract: Objective: This study aimed to evaluate the effectiveness of a blended teaching model combining BOPPPS and OBE in enhancing practical competence, clinical reasoning, self-directed learning, and innovative capacity among MNS students in the Advanced Health Assessment course. Methods: This quasi-experimental controlled study was conducted at Youjiang Medical University for Nationalities. Using cluster sampling, 2023 MNS students were assigned to the experimental group (BOPPPS-OBE blended teaching) and 2024 MNS students to the control group (lecture-based teaching). Both groups completed 48 classes of identical content. The primary outcome was practical competence assessed via OSCE. Secondary outcomes included professional knowledge, professional quality, research and innovation, clinical reasoning, practical competence, and practical innovation capability. Outcomes were assessed post-intervention. Data were analyzed using independent t-tests or Mann–Whitney U tests ($p<0.05$). Results: A total of 110 students were enrolled, with 50 in the experimental group and 60 in the control group. Baseline characteristics were comparable between groups. The experimental group demonstrated significantly higher OSCE scores (mean ± SD: 92.04±3.49 vs. 86.45±5.95, $p<0.001$). Secondary outcomes also favored the experimental group, including professional knowledge, professional quality, research and innovation, clinical reasoning, practical competence, and practical innovation capability. No adverse events were reported. Conclusion: The BOPPPS-OBE blended teaching model significantly improved practical competence, clinical reasoning, self-directed learning ability, and innovative capacity among MNS students compared to conventional instruction. This integrated approach offers an evidence-based pedagogical strategy for cultivating advanced practice competencies and may inform curricular reforms in graduate nursing education.
Keywords: BOPPPS; OBE; Practical and innovative competence; Master of nursing specialist students; Advanced health assessment course

1 INTRODUCTION

The advancement of specialized nursing practice necessitates a higher caliber of clinical expertise, demanding that Master of Nursing Specialist (MNS) graduates possess not only profound theoretical knowledge but also exceptional practical and innovative competencies. As advanced practice nurses, they are expected to demonstrate complex clinical reasoning, perform sophisticated health assessments, and generate innovative solutions to intricate patient care problems [1]. Consequently, the core objective of MNS education has shifted from the mere transmission of knowledge to the cultivation of these higher-order abilities, preparing graduates to function as independent, critical thinkers and leaders in clinical settings [2-3].

Within the MNS curriculum, Advanced Health Assessment serves as a cornerstone course, bridging foundational theoretical knowledge with advanced clinical practice. It is pivotal in developing a student's capacity for systematic data collection, diagnostic reasoning, and the formulation of evidence-based management plans [4]. However, traditional pedagogical approaches in this course often rely on lecture-based, teacher-centered models. Such methods, while efficient for delivering content, frequently fall short in fostering active learning, self-directed exploration, and clinical reasoning agility required for innovation in practice. A significant pedagogical gap exists in effectively engaging MNS students in deep learning processes that systematically build practical competence while simultaneously encouraging the intellectual flexibility needed for clinical innovation [5].

To address this challenge, educational frameworks that emphasize structured engagement and outcome-oriented design have gained prominence. The Outcome-Based Education (OBE) model, a student-centric approach, ensures that all curricular activities are meticulously aligned with predefined, measurable outcomes, guaranteeing that graduates attain the competencies demanded by clinical practice [6]. Complementing the macro-level structure of OBE is the BOPPPS (Bridge-in, Objective, Pre-assessment, Participatory Learning, Post-assessment, Summary) model. BOPPPS provides a micro-level, modular framework for lesson design that emphasizes active student participation, timely feedback, and the verification of achieved learning objectives. It is particularly effective in fostering deep cognitive engagement and skill mastery through its structured "Participatory Learning" phase [7-8]. While the individual application of OBE or BOPPPS in medical and nursing education has been documented, studies exploring their synergistic integration for

cultivating both practical and innovative skills in MNS students are notably scarce. A combined BOPPPS+OBE model is theoretically potent: OBE defines the essential outcome (a competent, innovative practitioner), while BOPPPS provides a structured, interactive pathway to achieve that outcome in each teaching unit. This integration has the potential to transform Advanced Health Assessment from a passive learning experience into an active, iterative process where students not only master advanced assessment techniques but also develop the capacity to critically evaluate and innovate upon them [9-10].

Therefore, this study aims to bridge this gap by designing, implementing, and evaluating an instructional model that integrates the BOPPPS structure with the OBE framework within the Advanced Health Assessment course for MNS students. We hypothesize that this integrated approach will significantly enhance students' practical operation skills and their innovative capacities compared to conventional teaching methods. By systematically analyzing the implementation process and its impact, this research seeks to provide a validated pedagogical strategy for cultivating high-level nursing talent, offering valuable insights for the reform of clinical specialty courses in graduate nursing education.

2 METHODS

2.1 Study Design and Setting

This was a quasi-experimental, non-randomized controlled study conducted at the Youjiang Medical University for Nationalities, Guangxi, China, between September 2023 and January 2025. The study aimed to evaluate the effectiveness of a blended teaching model integrating the BOPPPS framework with OBE principles on the practical and innovative competencies of MNS students in the Advanced Health Assessment course.

2.2 Participants

A cluster sampling method was employed to recruit participants. All MNS students enrolled in the 2023 academic year were assigned to the experimental group (Group A, n=50), while those enrolled in the 2024 academic year served as the control group (Group B, n=60). Inclusion criteria were: (1) full-time MNS students enrolled in the Advanced Health Assessment course; (2) no prior formal training in advanced health assessment; and (3) provision of written informed consent. Exclusion criteria were: (1) absence from more than 20% of course sessions; (2) withdrawal from the programme during the study period; or (3) incomplete outcome data. All eligible students were invited to participate, and written informed consent was obtained prior to the commencement of the study.

2.2 Interventions

2.2.1 Control group: conventional lecture-based instruction

Students in the control group received traditional teacher-centered instruction delivered by the same faculty members who taught the experimental group to ensure consistency in content coverage. The course was conducted in accordance with the standardized syllabus of Advanced Health Assessment, comprising 48 instructional classes (24 classes of theoretical lectures and 24 classes of laboratory-based practical sessions). Teaching methods included didactic lectures using PowerPoint presentations, textbook-based reading assignments, and supervised practice of assessment techniques in a simulation laboratory. No structured participatory learning activities, pre-session assessments, or post-session feedback mechanisms were incorporated beyond routine course requirements.

2.2.1 Control group: conventional lecture-based instruction

Students in the experimental group underwent a blended teaching model integrating the BOPPPS (Bridge-in, Objective, Pre-assessment, Participatory Learning, Post-assessment, Summary) framework with Outcome-Based Education (OBE) principles, specifically designed to cultivate practical competence and innovative thinking. The intervention was delivered over the same 48-classes duration as the control group, with content coverage identical to the control group to ensure comparability. The instructional design followed a six-stage BOPPPS structure for each teaching unit, guided by OBE principles. The detailed implementation process is illustrated in Figure 1.

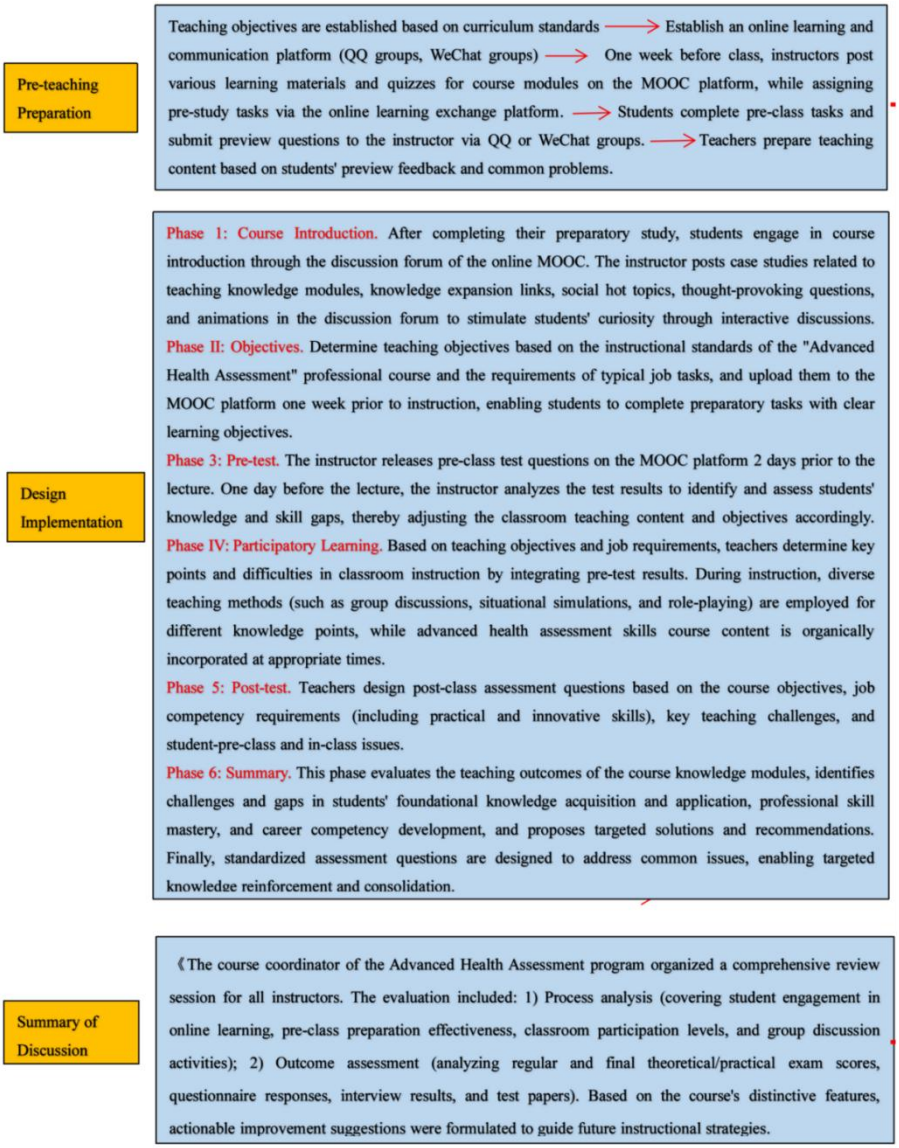

Figure 1 Flowchart of the Integrated BOPPPS-OBE Implementation Process

Instruction was delivered by the same faculty members as in the control group to minimise instructor-related bias. Fidelity to the intervention protocol was ensured through regular teaching team meetings, peer observation, and review of session recordings.

2.5 Evaluation indicators

2.5.1 Scale for practical and innovative competence of master of nursing specialist students

The Assessment Scale for Practical and Innovative Competence of Master of Nursing Specialist Students, developed by Meng Na et al [11], was administered to evaluate students' practical and innovative competence before and after the implementation of the blended teaching model integrating the BOPPPS framework with OBE principles in the Advanced Health Assessment course, with a specific focus on cultivating practical competence. Following informed consent, a total of 110 questionnaires were distributed and collected on site, yielding a valid response rate of 100%. The scale comprises 20 items across five dimensions: professional knowledge (3 items), professional quality (3 items), research and innovation (6 items), clinical reasoning (4 items), and practical competence (4 items). A 5-point Likert scale was used, ranging from "strongly disagree" to "strongly agree", with scores from 1 to 5 assigned accordingly. The total score was the sum of all item scores. Based on the 5-point scoring system, practical and innovative competence was categorized into five levels: <60 (poor), 60–69 (qualified), 70–79 (moderate), 80–89 (good), and ≥90 (excellent). The overall Cronbach 's α coefficient of the scale was 0.841, with dimension-specific Cronbach's α coefficients ranging from 0.678 to 0.819. The Kaiser–Meyer–Olkin (KMO) measure was 0.737, and Bartlett 's test of sphericity yielded $P<0.001$, indicating satisfactory internal consistency and a well-designed questionnaire with reliable results.

2.5.2 Academic performance

The final examination scores of the two groups of nursing students were compared. The examination papers were set by the same lecturer to ensure that the examination knowledge points, and difficulty was consistent. Included objective structured clinical examination (OSCE) skill score.

2.6 Statistical Methods

All data analysis will be conducted using the STATA statistical software package, Release 17.0 (Stata Corp LLC, College Station, Texas, USA, 2019). The count data of the two groups were expressed as [n (%)], and the chi-square test was used for comparison between the two groups. The measurement data of the two groups were described by mean ± standard deviation (x ± s), and the values between the two groups were compared using independent sample t-test, with $P < 0.05$ indicating statistically significant differences.

3 RESULTS

3.1 Comparison of Total Scores in Practical Innovation Ability between Master's Degree Students In Nursing Professional Degree in the Experimental Group and Control Group

The intervention group (n = 60) scored significantly higher than the control group (n = 50) across all six dimensions ($P < 0{\cdot}001$ for all comparisons). Mean scores for the composite measure of practical innovation capability were 70.54 ± 3.81 versus 69.02 ± 4.02 (t = 14·003). Significant differences were also observed for professional knowledge, professional quality, research and innovation, clinical reasoning, and practical competence (all $P < 0{\cdot}001$).

Table 1 Comparison of Total Scores in Practical Innovation Ability between Intervention and Control Groups (Mean±SD, points)

Group	N	Professional knowledge	Professional quality	Research and innovation	Clinical reasoning	Practical competence	Practical Innovation Capability
Control group	50	10.07±1.46	9.98±1.59	18.86±2.08	14.67±2.32	15.43±1.53	69.02±4.02
Intervention group	60	11.92±1.18	12.16±1.50	22.08±2.14	16.30±1.45	17.08±1.36	70.54±3.81
T value		7.270	7.330	7.955	4.326	5.887	14.003
P		<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*

* P<0.001

3.2 Comparison of OSCE Skills between Intervention and Control Groups

The intervention group (n = 50) achieved significantly higher OSCE skills test scores (92.04 ± 3.49 vs 86.45 ± 5.95, t = 5.851, $P < 0.001$) than controls (n = 60) ($P < 0.001$).

Table 2 Examination Scores of Two Groups (Mean±SD, Points)

Group	N	OSCE Skills Scores
Intervention group	50	92.04±3.49
Control group	60	86.45±5.95
T value		5.851
P		<0.001*

* P<0.001

4 DISCUSSIONS

The integration of BOPPPS and OBE represents a pedagogical synergy that addresses two fundamental challenges in advanced nursing education: learner engagement and outcome alignment. BOPPPS provides a structured yet flexible framework that scaffolds the learning process through its six-phase cycle, with particular emphasis on participatory learning and real-time feedback. OBE, by contrast, operates at the curricular design level, ensuring that teaching activities, assessment methods, and learning outcomes are intentionally aligned. When combined, this model shifts the instructional focus from content delivery to competency development—a distinction that may explain the broad-spectrum improvements observed across both cognitive and skill-based domains.

One plausible mechanism underlying the enhanced performance in clinical reasoning and practical competence is the iterative nature of participatory learning within the BOPPPS framework [12]. Unlike traditional lecture-based approaches, which often promote passive knowledge acquisition, participatory learning compels students to articulate clinical judgments, respond to case-based challenges, and receive immediate corrective feedback [13]. This repeated cycle of action and reflection mirrors the cognitive processes required in real clinical decision-making, thereby strengthening not only procedural skills but also the metacognitive capacity to evaluate one's own reasoning [14-16]. Such active engagement may be particularly critical for Master of Nursing Specialist students, who are expected to transition from competent practitioners to advanced clinical leaders.

The observed improvement in research and innovation warrants attention, as this dimension is often resistant to change in clinically focused curricula. Within the integrated model, the post-assessment and summary phases of BOPPPS create opportunities for students to synthesise knowledge, identify gaps, and propose novel solutions—activities that align closely with the early stages of the innovation process [17]. Furthermore, the OBE emphasis on predefined competencies may have elevated students' awareness of innovation as a formal expectation rather than an ancillary skill [18]. This reframing may have encouraged students to approach clinical problems with a mindset oriented toward improvement and inquiry, which are foundational to both research capacity and practice innovation.

The composite measure of practical innovation capability, while significantly improved, showed a smaller relative increase compared with other dimensions. This pattern suggests that practical innovation—defined as the ability to generate and implement novel solutions in real-world contexts—may be more complex and slower to develop than discrete competencies such as knowledge acquisition or technical skill [19-20]. Innovation capability likely requires not only cognitive readiness but also exposure to authentic problems, tolerance for ambiguity, and opportunities for iterative prototyping of solutions within clinical settings [21]. A single course, even one enhanced by active learning strategies, may provide sufficient foundation but insufficient sustained practice to fully cultivate this higher-order competency. This interpretation is consistent with theories of expertise development, which posit that advanced capabilities emerge from extended engagement in deliberate practice across varied contexts [22].

5 ETHICAL STATEMENTS

All participants were voluntarily recruited through an announcement and provided informed consent prior to their engagement in this study, which guaranteed anonymity and strictly limited the use of responses to research purposes in compliance with standard ethical guidelines.

6 LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

This study has several limitations. First, as a single-center case study, the findings may reflect institutional or contextual factors—such as instructor expertise or pre-existing student motivation—that are not easily replicated elsewhere. Second, the outcome measures, while multidimensional, were limited to immediate post-course assessments. Whether the observed gains translate into sustained clinical performance or innovative practice after graduation remains unexamined. Third, the composite practical innovation capability measure, though statistically significant, was a course-embedded assessment rather than a validated external instrument, which may limit its comparability across studies.

Future research should prioritize longitudinal designs that track students' clinical performance and innovation outputs beyond the classroom. Multi-center trials with standardized teaching protocols would help establish the generalizability of this integrated model. Additionally, qualitative investigations into students' learning experiences—particularly how they perceive the transition from structured guidance to autonomous problem-solving—could illuminate the cognitive and affective processes that underpin the development of practical innovation capability. Finally, exploring whether modifications to the BOPPPS–OBE model, such as extended clinical immersion components or mentorship pairing, yield greater gains in innovation outcomes would be a valuable next step.

7 CONCLUSIONS

This case study demonstrates that integrating BOPPPS with Outcome-Based Education in the Advanced Health Assessment course significantly enhances Master of Nursing Specialist students' performance across multiple competencies, including professional knowledge, clinical reasoning, practical competence, and practical innovation capability. The synergistic model combines structured learner engagement with outcome-aligned curriculum design, offering a pedagogically sound approach to advanced nursing education. While the gains in practical innovation capability were modest relative to other domains, the overall findings support the scalability of this integrated framework. Future longitudinal and multi-centre studies are warranted to validate its sustained impact on clinical practice and innovation outcomes.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

FUNDING

This research was supported by the Department of Education of Guangxi Zhuang Autonomous Region (Innovation Project of Guangxi Graduate Education [Grant No: JGY2023290] and Guangxi Vocational Education Teaching Reform Research Project [Grant No: GXGZJG2024B267]).

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