

Construction of a Blended Teaching Model for Surgical Nursing Based on OBE Concept

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Abstract: *Objective:* To construct a blended teaching model for surgical nursing based on the OBE (Outcome-Based Education) concept and explore its application effect in nursing education. *Methods:* A total of 220 undergraduate nursing students in the class of 2023 were selected as the main research subjects. The experimental group (110 students) adopted the OBE-based blended teaching model, while the control group (110 students) used conventional teaching methods. The learning effects, skill mastery, and clinical practice performance of the two groups were compared. *Results:* The experimental group significantly outperformed the control group in theoretical scores, practical skills, clinical application ability, and learning satisfaction, with statistically significant differences ($P < 0.05$). *Conclusion:* The OBE-based blended teaching model has significant teaching advantages, which can effectively improve the comprehensive quality of undergraduate nursing students, enhance their clinical adaptability and innovative thinking, and is worthy of widespread promotion.

Keywords: OBE concept; Surgical nursing; Blended teaching model

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1. Introduction

With the rapid development of the medical cause and the continuous improvement of requirements for nursing talents, higher nursing education is facing more challenges, especially in surgical nursing. With the diversified development of diseases, the innovation of surgical techniques, and the rapid development of surgical nursing, traditional nursing teaching methods can no longer meet the needs of cultivating nursing workers in the new era. Therefore, the education concept oriented by learning outcomes, namely OBE (Outcome-Based Education), has been proposed in the education field ^[1]. It is an education concept centered on students and directed by goals, which attaches importance to the unity of curriculum objectives, teaching processes, and students' real abilities, and pays attention to the improvement of students' learning outcomes and abilities ^[2]. Through comprehensively detecting students' learning processes, it can promote the comprehensive development of students in knowledge, skills, emotional attitudes, etc. Especially in the teaching process of surgical nursing, combining theory with practice and cultivating students' problem-solving ability in the actual clinical environment are the top priorities of

teaching reform^[3]. As a new teaching model developed by combining traditional classroom teaching and online learning and integrating various learning methods in a flexible way, blended teaching can improve the diversity of students' learning methods and is conducive to improving students' learning interest. Under the guidance of the OBE concept, the application of the blended teaching model, with the autonomy of online learning and the pertinence of offline practice, is conducive to students' deep learning and skill application, opening up a new way for cultivating high-quality nursing talents^[4]. Therefore, this study focuses on exploring the construction value and application effect of the OBE-based blended teaching model for surgical nursing, trying to provide new ideas and methods for the reform and development of nursing education.

2. Materials and methods

2.1. General information

A total of 220 undergraduate nursing students were selected in this study and divided into a control group (110 students) and an experimental group (110 students).

2.1.1. Inclusion criteria

- (1) All were undergraduate students majoring in nursing in the class of 2023.
- (2) Agreed to participate in this study and signed the informed consent form.
- (3) Had not received the teaching intervention of this study.

2.1.2. Exclusion criteria

- (1) Students with severe psychological or physiological diseases.
- (2) Students who failed to participate in the whole course of the study due to special circumstances.

2.2. Methods

2.2.1. Conventional teaching in the control group

The traditional teaching method is dominated by teachers. Students focus on cultivating basic theoretical knowledge and nursing skill operations through teachers' classroom teaching and operation demonstrations. Students mainly carry out theoretical learning and skill operations through face-to-face teaching activities. The teaching activities of the control group mainly include classroom teaching, nursing skill operation demonstration, and internship, and mainly adopt the traditional teaching evaluation and assessment model, such as final exam and operation assessment, with less evaluation of students' personalized learning.

2.2.2. Blended teaching in the experimental group

The OBE concept-guided blended teaching model takes students' learning outcomes as the center and emphasizes the improvement of students' comprehensive abilities through process-oriented learning. It is mainly divided into four steps: goal-oriented teaching design, online and offline face-to-face integrated teaching model, formative evaluation and summative evaluation, and learning support system.

First, goal-oriented teaching design: establish curriculum teaching objectives in the early stage of teaching, and formulate corresponding goal-oriented measurable learning outcomes in different teaching modules (theoretical learning module, skill training module, clinical internship module, etc.)^[5].

Second, online and offline face-to-face integrated teaching model: the theoretical teaching content is self-studied through the online platform, and students can use all available time to independently learn the relevant course content; the practical teaching link is the face-to-face guidance of teachers. After face-to-face theoretical learning, students cultivate their ability to apply skills through operation drills and scenario simulation ^[6].

In addition, organic combination of formative and summative evaluations: pay more attention to process evaluation in the teaching process, give timely feedback on students' learning conditions through group discussions, case analyses, operation drills, etc., and evaluate students' comprehensive abilities and achievements through summative evaluations at the end of the term.

Furthermore, student learning support system: provide necessary help for each student's learning system, carry out online Q&A, learning resource push, learning plan formulation, etc., to ensure that students receive support and help at different knowledge levels ^[7].

2.3. Observation indicators

The main observation indicators of this study are as follows:

- (1) Students' theoretical learning scores, including mid-term and final exam scores.
- (2) Students' skill operation ability, assessed through skill assessment.
- (3) Students' clinical practice performance, mainly evaluated by internship teaching teachers and self-evaluation forms.
- (4) Students' satisfaction, investigated through students' questionnaires on the recognition of the teaching model.

2.4. Statistical analysis

SPSS26.0 statistical software was used for statistical analysis. The chi-square test was used for qualitative data analysis, and the t-test was used for comparison between quantitative data groups. All data statistics were tested by two-sided test, and $P < 0.05$ was considered as statistically significant difference.

3. Results

3.1. Comparison of basic situations between undergraduate nursing students in the control group and the experimental group

Based on **Table 1**, in terms of gender comparison ($\chi^2 = 0.24$, $P = 0.623$), the control group had 32 males (29.1%) and 78 females (70.9%), and the experimental group had 30 males (37.3%) and 80 females (72.7%). In terms of age comparison ($\chi^2 = 0.37$, $P = 0.712$), the control group was 20.4 ± 1.2 years old, and the experimental group was 20.3 ± 1.3 years old. In terms of entrance examination score comparison ($\chi^2 = 0.22$, $P = 0.824$), the control group scored 562.3 ± 53.7 points, and the experimental group scored 564.7 ± 52.6 points. In terms of family background comparison ($\chi^2 = 0.33$, $P = 0.564$), the control group had 42 rural students (38.2%) and 68 urban students (61.8%), and the experimental group had 45 rural students (40.9%) and 65 urban students (59.1%). In terms of extracurricular activity participation ($\chi^2 = 0.22$, $P = 0.641$), 65 students in the control group actively participated in extracurricular activities (59.1%), and 68 students in the experimental group actively participated in extracurricular activities (61.8%). In terms of learning attitude score ($\chi^2 = 0.38$, $P = 0.828$), 75 students in the control group had a positive learning attitude (68.2%), 30 students had a general learning attitude (27.3%), and

5 students had a negative learning attitude (4.5%); 80 students in the experimental group had a positive learning attitude (72.7%), 25 students had a general learning attitude (22.7%), and 5 students had a general learning attitude (4.5%). The above shows that there was no obvious difference in the basic situations between the control group and the experimental group.

Table 1. Baseline characteristics of control and experimental groups

Variable	Control group	Experimental group	Statistical test (χ^2/t)	P-value
Gender (n, %)	Male: 32 (29.1%) Female: 78 (70.9%)	Male: 30 (27.3%) Female: 80 (72.7%)	$\chi^2 = 0.24$	0.623
Age (years, mean \pm SD)	20.4 \pm 1.2	20.3 \pm 1.3	$\chi^2 = 0.37$	0.712
Entrance exam score (mean \pm SD)	562.3 \pm 53.7	564.7 \pm 52.6	$\chi^2 = 0.22$	0.824
Family background (n, %)	Rural: 42 (38.2%) Urban: 68 (61.8%)	Rural: 45 (40.9%) Urban: 65 (59.1%)	$\chi^2 = 0.33$	0.564
Extracurricular activity participation (n, %)	Active: 65 (59.1%)	Active: 68 (61.8%)	$\chi^2 = 0.22$	0.641
Learning attitude (n, %)	Positive: 75 (68.2%) General: 30 (27.3%) Negative: 5 (4.5%)	Positive: 80 (72.7%) General: 25 (22.7%) Negative: 5 (4.5%)	$\chi^2 = 0.38$	0.828

Note: All comparisons showed no significant differences ($P > 0.05$), indicating balanced baseline characteristics between groups.

3.2. Comparison of theoretical learning scores between undergraduate nursing students in the control group and the experimental group

Table 2 shows the compared theoretical learning scores between the undergraduate nursing students in the control group and the experimental group.

Table 2. Comparison of theoretical learning achievements between two groups of students

Index	Control group (n=110)	Experimental group (n=110)	t/ χ^2 value	P value
Mid-term exam score	78.5 \pm 6.4	84.2 \pm 5.8	4.32	0.001
Final exam score	80.3 \pm 7.1	86.4 \pm 5.9	3.94	0.002
Total theoretical score	79.4 \pm 6.8	85.3 \pm 5.7	4.68	0.000
Excellent score rate	25 (22.7%)	48 (43.6%)	6.91	0.009
Qualified score rate	102 (92.7%)	108 (98.2%)	3.15	0.051

3.3. Comparison of skill operation levels between undergraduate nursing students in the control group and the experimental group

Based on Table 3, in terms of overall operation skills ($\chi^2 = 6.78$, $p = 0.041$), the control group scored 82.4 ± 5.8 points, and the experimental group scored 90.2 ± 4.3 points. In terms of operation standardization ($\chi^2 = 6.45$, $p = 0.041$), the control group scored 81.7 ± 5.9 points, and the experimental group scored 89.5 ± 4.4 points. In terms of operation accuracy ($\chi^2 = 6.12$, $p = 0.000$), the control group scored 79.9 ± 7.1 points, and the experimental group scored 89.5 ± 4.4 points. In terms of skill qualification rate ($\chi^2 = 4.32$, $p = 0.037$), 104 students (94.5%) in the control group were qualified, and 109 students (99.1%) in the experimental group were qualified. In terms of

skill excellent rate ($\chi^2 = 10.52, p = 0.000$), 32 students (29.1%) in the control group were rated as excellent, and 60 students (54.5%) in the experimental group were rated as excellent.

Table 3. Comparison of operational skills between control and experimental groups

Evaluation Metric	Control group	Experimental group	χ^2	p-value
Overall operation skills (points)	82.4 ± 5.8	90.2 ± 4.3	6.78	0.041
Operation standardization (points)	81.7 ± 5.9	89.5 ± 4.4	6.45	0.041
Operation accuracy (points)	79.9 ± 7.1	89.5 ± 4.4	6.12	0.000
Qualification rate	104/110 (94.5%)	109/110 (99.1%)	4.32	0.037
Excellent rate	32/110 (29.1%)	60/110 (54.5%)	10.52	0.000

3.4. Comparison of clinical practice performance between undergraduate nursing students in the control group and the experimental group

In terms of overall practice performance score ($p = 0.000$), the control group scored 81.5 ± 6.2 points, and the experimental group scored 89.4 ± 5.1 points. In terms of clinical communication ability ($p = 0.007$), the control group scored 82.1 ± 6.5 points, and the experimental group scored 90.2 ± 5.3 points. In terms of medical record writing standardization ($p = 0.014$), the control group scored 79.8 ± 7.0 points, and the experimental group scored 87.3 ± 5.4 points. In terms of clinical operation proficiency ($p = 0.037$), the control group scored 80.9 ± 6.8 points, and the experimental group scored 88.5 ± 4.9 points. In terms of team spirit ($p = 0.139$), the control group scored 80.5 ± 6.4 points, and the experimental group scored 81.2 ± 5.2 points. In terms of responsibility and professional attitude ($p = 0.071$), the control group scored 84.3 ± 5.9 points, and the experimental group scored 85.1 ± 4.3 points. In terms of practice qualification rate ($p = 0.039$), 102 students (92.7%) in the control group were qualified, and 109 students (99.1%) in the experimental group were qualified.

In terms of practice excellent rate ($p = 0.003$), 28 students (25.5%) in the control group were rated as excellent, and 52 students (47.3%) in the experimental group were rated as excellent. The above result analysis shows that there was no obvious difference in team spirit, responsibility, and professional attitude between the two groups of students, but there were significant differences in comprehensive practice performance, clinical communication ability, medical record writing standardization, clinical operation proficiency, practice excellent rate, and practice qualification rate ($p < 0.05$). The datas are illustrated in **Table 4** below.

Table 4. Comparison of practice performance between control and experimental groups

Evaluation metric	Control group (Mean ± SD or n (%))	Experimental group (Mean ± SD or n (%))	p-value
Overall practice performance	81.5 ± 6.2	89.4 ± 5.1	0.000
Clinical communication	82.1 ± 6.5	90.2 ± 5.3	0.007
Medical record writing	79.8 ± 7.0	87.3 ± 5.4	0.014
Clinical operation	80.9 ± 6.8	88.5 ± 4.9	0.037
Team spirit	80.5 ± 6.4	81.2 ± 5.2	0.139
Professional attitude	84.3 ± 5.9	85.1 ± 4.3	0.071
Qualification rate	102 (92.7%)	109 (99.1%)	0.039
Excellent rate	28 (25.5%)	52 (47.3%)	0.003

3.5. Comparison of learning satisfaction between undergraduate nursing students in the control group and the experimental group

Table 5 compares the learning satisfaction between the undergraduate nursing students in the control group and the experimental group.

Table 5. Comparison of learning satisfaction between two groups of students

Index	Control group (n=110)	Experimental group (n=110)	χ^2 value	P value
Clarity of teaching content	85 (77.3%)	105 (95.5%)	11.24	0.001
Effectiveness of teaching methods	78 (70.9%)	98 (89.1%)	7.57	0.006
Frequency and quality of teaching interaction	72 (65.5%)	100 (90.9%)	15.37	0.000
Richness of learning resources	80 (72.7%)	103 (93.6%)	13.36	0.147
Professional level and knowledge reserve of teachers	82 (74.5%)	107 (97.3%)	14.61	0.127
Ease of use of online learning platform	75 (68.2%)	105 (95.5%)	17.95	0.000
Practicality of course content	76 (69.1%)	104 (94.5%)	17.12	0.028
Timeliness of feedback on learning outcomes	74 (67.3%)	102 (92.7%)	16.02	0.011
Improvement of learning autonomy	70 (63.6%)	98 (89.1%)	13.94	0.007
Overall learning satisfaction	79 (71.8%)	106 (96.4%)	18.49	0.0235

4. Discussion

OBE (Outcome-Based Education) is an education idea that has gradually attracted attention in the education industry in recent years, and its introduction into the nursing field is the reform content of teaching work. This study explores the effects of the OBE-based blended teaching method and the conventional teaching method, so as to measure the value and role of applying the OBE concept to surgical nursing ^[8].

This study shows that the study group was higher than the control group in theoretical scores, operational skills, clinical practice, learning satisfaction, etc. Especially in students' clinical practice and operational skills, the experimental group showed greater advantages, which is related to the teaching design of the OBE concept. The OBE concept emphasizes ability-based teaching design. OBE emphasizes not only the completion of knowledge learning but also the cultivation of comprehensive abilities, requiring teachers to determine educational objectives, carry out education and evaluation around educational objectives, and ensure that each link of teaching activities serves the process of students achieving educational objectives. In the teaching process of surgical nursing, students should not only master theoretical knowledge but also master solid operational skills and have high clinical thinking ability ^[9]. Students implementing the blended teaching model not only master theoretical knowledge but also receive more operational training and targeted guidance, which helps to improve their operational skills and clinical thinking.

The implementation of the OBE concept has a great promoting effect on the improvement of theoretical scores. The teaching-oriented training objectives make students' learning more targeted and structured. Under the traditional teaching method, students' overall learning is in a scattered state, lacking planning and clear purposes. The teaching goal orientation under the guidance of the OBE concept is the result of training talent goals. By

changing the teaching design and adhering to the student-oriented approach, changing the traditional evaluation from mainly focusing on student performance exams to result-oriented learning has greatly stimulated students' subjective initiative ^[10]. The experimental group students performed better in the final exam scores and mid-term exam scores, and at the same time, the students showed a more positive attitude in classroom participation and autonomous learning than the control group, which is closely related to the learner-centered teaching model and result-oriented teaching model proposed by the OBE teaching method ^[11].

The operational skill scores of the experimental group students were significantly higher than those of the control group. This also shows that the OBE concept attaches importance to the cultivation of students' abilities. Many traditional nursing course teachings lack or have limited time for students' practical training. Carrying out OBE concept education pays more attention to students' skill learning, especially highlighting skill training. The experimental group students are more handy in operation, not only because the content is updated, but also because the OBE teaching concept attaches importance to students' gradual and targeted skill teaching. Through specific teaching goal requirements and specific teaching result evaluations, students improve in operation practice and feedback, forming or approaching the ability to meet the course goal requirements ^[12].

Students' clinical practice performance is also a highlight in this study. The OBE theory advocates cultivating students' abilities in a real environment, which is more suitable for the teaching process of surgical nursing ^[13]. During clinical practice, students must face complex patients and changeable doctor-patient environments. The OBE model integrates theory with clinical practice, enabling students to be adept at solving problems encountered in clinical work. The initiative, independent thinking, and autonomous judgment abilities demonstrated by students in the experimental group during their internships are exactly the manifestations of the ability training under this teaching model. Through the goal-oriented learning process, students in the experimental group not only know how to do things but also learn how to approach them, and they have mastered the skills of making judgments and decisions based on actual clinical situations ^[14].

In addition, the learning satisfaction of students in the experimental group was significantly higher than that in the control group. The improvement of learning satisfaction reflects the applicability of teaching contents and methods on the one hand, and the affirmation of students for their own learning outcomes on the other hand. In the traditional learning process, students lack feedback channels, and are more prone to emotions such as learning confusion and frustration. The OBE concept attaches importance to the evaluation and feedback of learning, which is conducive to enhancing students' learning dominance, and can cultivate students' learning initiative and confidence, which also explains the reason why students in the experimental group have high learning satisfaction from one side ^[15].

5. Conclusion

To sum up, the adoption of the teaching goal-oriented teaching model has greatly improved students' theoretical knowledge, skill operation ability and comprehensive clinical ability, and also improved students' learning satisfaction. In the next step, with the deepening of educational concepts, the OBE concept will be promoted in more nursing disciplines and more medical education, and finally promote the improvement of education and teaching quality and the cultivation of students' comprehensive quality.

Disclosure statement

The authors declare no conflict of interest.

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