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An Empirical Study on the Combined Application of the DEDICT Teaching Model and Scenario Simulation Among Operating Room Nursing Interns

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Abstract

Objective: Discuss the effect of the DEDICT teaching mode combined with scenario simulation among operating room nursing interns. **Methods:** We selected 110 nursing interns in our hospital's operating room between October 2024 and September 2025. We randomly assigned them to a control group or an experimental group using a random number table. The control group received conventional teaching, while the experimental group underwent DEDICT teaching combined with scenario simulation. We compared the Theoretical and Practical Performance Scores, the Nursing Staff's Self-Directed Learning Ability Scores, the Nursing Competency Scores, and the Teaching Effectiveness Satisfaction Evaluation between the groups. **Results:** The Theoretical and Practical Performance Scores in the experimental group were 92.16 ± 7.22 and 94.36 ± 3.15, significantly higher than those of the control group at 83.24 ± 6.35 and 82.17 ± 4.54. The experimental group demonstrated higher Nursing Staff's Self-Directed Learning Ability Scores (147.19 ± 12.34 vs. 137.65 ± 11.55) and Nursing Competency Scores (192.54 ± 32.37 vs. 170.83 ± 39.64) than the control group, with all differences being statistically significant ($P < 0.05$). The Teaching Effectiveness Satisfaction Rate in the experimental group was 98.18%, exceeding that of the control group (89.09%). The rank-sum test yielded Z = -2.475, P =0.014. **Conclusions:** The application of the DEDICT teaching model combined with scenario simulation enhances nursing interns' theoretical and practical performance, improves their autonomous learning capabilities, elevates their job competency, and facilitates their adaptation to clinical nursing work more effectively and expeditiously. This approach is of significant importance to nursing education and warrants further implementation.

Keywords: DEDICT, scenario simulation, operating room, nursing interns, effect

1. Introduction

Nursing is an applied discipline. The clinical placement phase is a crucial link in nursing education, bridging theory and practice. This phase is fundamental to improving teaching quality and training qualified nursing professionals (Jacobsen et al., 2022; Qian et al., 2021). Operating rooms require specialised expertise, accommodate diverse surgical procedures, and involve complex knowledge. Nursing interns have limited practical opportunities in these settings, which makes it challenging to master a range of skills and integrate theoretical knowledge. Conventional one-to-one mentoring often leads students to lack autonomy, critical thinking, and comprehensive skill development (Xiang et al., 2025; Wang et al., 2023).

The DEDICT teaching model in Australia's vocational education system includes: Demonstrate the complete process, Explain, Demonstrate step-by-step procedures, Imitate, Correct, and Test. This approach builds on experiential learning and constructivist theory. It helps unify instruction, learning, and practice. The model emphasizes process-based assessment. It gives structured guidance for reflection and helps students internalize knowledge. By applying competency-based vocational education in practice training, the goal is to promote holistic student development (Fang et al., 2016). Scenario simulation teaching involves educators designing specific clinical situations around required themes. Students actively participate, allowing interns to develop skills and knowledge in environments that closely resemble clinical reality (Guo et al., 2025; Liu et al., 2021).

This study applied the DEDICT teaching model, combined with scenario simulation, to train operating room nursing interns. This approach facilitates systematic mastery of theoretical knowledge and operational skills, stimulates learning interest, enhances comprehensive competencies, and improves teaching quality. The following section reports the findings.

2. Data and Methods

2.1 Clinical Data

We selected 110 nursing interns in our hospital's operating room between October 2024 and September 2025. We randomly assigned them to a control or an experimental group using a random number table to ensure a scientific, objective sequence, with each group comprising 55 individuals. We achieved allocation concealment using opaque, sealed envelopes. The control group comprised 6 males and 49 females, with a mean age of (21.37 ± 2.32) years. Twenty-six participants were from undergraduate institutions, while 29 were from specialist colleges. The experimental group included 4 males and 51 females, with a mean age of (21.48 ± 2.16) years. Twenty-three participants were from undergraduate institutions, and 32 were from specialist colleges. Comparisons of general characteristics, including age, gender, and educational background, between the two groups revealed no statistically significant differences ($P > 0.05$), indicating comparability.

2.2 Sample Size

We calculated the sample size based on the formula for comparing two sample means: $n1=n2=(Z_{1-\alpha/2}+Z_{1-\beta})^2\times(\sigma_1^2+\sigma_2^2)/\delta^2$. Using theoretical assessment scores from the relevant literature (Hao et al., 2025), we set $\sigma_1=13.56$, $\sigma_2=13.38$, and $\delta=9.5$. Substituting these values into the formula gives $n \approx 92$. To increase the sample size by 20%, we set the final total sample size at 110 participants.

2.3 Eligibility Criteria

Inclusion criteria: Nursing interns assigned to a four-week operating room placement; individuals who are conscious and have no communication problems; participants who voluntarily consent to join the study. Exclusion criteria: Individuals who had adverse stress reactions during the placement; students who failed theoretical assessments at their institution.

2.4 Research Methods

Control group: Used standard teaching methods. Nursing interns received training on the operating room environment, rules, and infection control practices in accordance with guidelines. Each intern was assigned a preceptor for one-on-one supervision. Preceptors taught theory and demonstrated key clinical procedures. Weekly group sessions (2 hours) included how to prepare instruments, organize the environment, pass instruments, maintain aseptic technique, and dispose of medical waste. There were demonstrations of skills and teaching rounds. Preceptors were required to be registered nurses with a college degree and at least 3 years of experience.

Experimental group: Building on conventional teaching, the DEDICT teaching model, combined with scenario simulation, was applied to clinical instruction for operating room nursing interns. Using cholecystectomy simulation as an example, the specific practical teaching model was as follows:

1. Demonstrate the complete process: The nursing procedure for cholecystectomy involves several steps. These were surgical handwashing, donning surgical gowns, wearing sterile gloves, preparing the surgical tray, preoperative disinfection, instrument passing and coordination, and postoperative management. The supervising nurse demonstrates the entire process through scenario simulation, helping nursing interns visually understand the steps in a surgical procedure. It gives them a general idea of the content and stimulates their initiative to learn; this also prepares them for the next explanatory phase.

2. Explain: The instructor explains the operational methods, precautions, and related theory for each step to the trainee. The explanation should have a clear purpose, highlight key points, and use time efficiently. Avoid long explanations that reduce enthusiasm, as this can create a smooth transition to the following teaching steps. For example, explain the purpose, method, and scope of surgical handwashing. Distinguish it from other forms of hand hygiene.

3. Demonstrate step-by-step procedures: The instructor should demonstrate each step of the process. The demonstration must be precise and follow established standards, enabling the

trainee to accurately imitate the actions. Inaccurate demonstrations may confuse the trainee. The step may occur after the explanation or alongside it, depending on the situation. For straightforward tasks like donning surgical gowns and sterile gloves, demonstrate them after explaining the steps. For more complex tasks, such as preparing the surgical tray, demonstrate while explaining.

4. Imitate: Nursing interns follow the step-by-step procedures demonstrated by their preceptors to learn specific techniques. Imitation makes learning engaging and avoids classroom monotony. Preceptors must carefully observe interns' procedures and document any issues during execution. Each preceptor should oversee no more than two interns at a time to allow practical observation and feedback.

5. Correct: After completing imitation learning, the instructor provides corrective feedback based on observations. The instructor identifies the correct and incorrect steps in the trainee's process and guides corrections. The instructor may even re-demonstrate incorrect steps, allowing interns to correct through re-imitation until mastery is achieved.

6. Test: After completing a teaching session, nursing interns independently perform procedures without prompts. Instructors use custom evaluation forms to assess each step, marking correct steps with a "√" and incorrect ones with an "×," while providing notes on errors. Post-assessment, interns identify their weaknesses, emphasizing process evaluation over traditional end-of-term scores.

2.5 Observation Indicators

(1) Theoretical and Practical Performance. The teaching team designed examination questions based on the operating room nursing internship curriculum. These questions assessed specialised theoretical knowledge and clinical skills. Both groups of nursing interns underwent identical final examinations, with both theoretical and practical assessments scored on a 100-point scale.

(2) Nursing Staff's Self-Directed Learning Ability. The Nursing Staff's Self-Directed Learning Ability Evaluation Scale (Xiao et al., 2008) was administered at the end of the rotation. This scale comprises four dimensions and 34 items: self-motivation beliefs, task analysis, self-monitoring and regulation, and self-evaluation. Scored on a 5-point Likert scale, the total score ranges from 34 to 170, with higher scores indicating stronger self-directed learning ability. The Cronbach's α coefficient for the total scale was 0.944.

(3) Nursing Competency. The Chinese Registered Nurse Core Competency Assessment Scale (Liu et al., 2008) was administered at the end of the rotation. This scale comprises seven dimensions and 58 items: nursing practice competence, education and counselling competence, adherence to legal/ethical practice competence, critical thinking and research competence, professional development competence, leadership competence, and interpersonal communication competence. Scored on a 5-point Likert scale, the total score ranges from 0 to 232, with higher scores indicating stronger core competencies. The Cronbach's α coefficient for the total scale was 0.80.

(4) Teaching Effectiveness Satisfaction. A questionnaire designed by our hospital was administered at the end of the rotation. The total score ranged from 0 to 100, with 80–100 indicating "very satisfied," 60–79 indicating "satisfied," and below 60 indicating "dissatisfied." Teaching effectiveness satisfaction rate = (Number of "very satisfied" + Number of "satisfied") / Total Number of cases × 100%.

2.6 Statistical Methods

Statistical analysis was performed using SPSS 24.0 software. Quantitative data are expressed as mean ± standard deviation. Comparisons were made using the t-test. Count data are presented as (n, %). Comparisons were made using the chi-square (χ^2) test. Comparisons of ordinal data were made using the rank-sum test. A P value < 0.05 was considered statistically significant.

3. Results

3.1 Theoretical and Practical Performance

The Theoretical and Practical Performance Scores of nursing interns in the experimental group were 92.16 ± 7.22 and 94.36 ± 3.15, significantly higher than those of the control group (83.24 ± 6.35 and 82.17 ± 4.54). The difference was statistically significant ($P < 0.001$). See Table 1.

Table 1. Theoretical and Practical Performance Scores (points, $\bar{x}\pm s$)

Group	n	Theoretical Performance	Practical Performance
Experimental group	55	92.16±7.22	94.36±3.15
Control group	55	83.24±6.35	82.17±4.54
t		12.192	11.735
P		<0.001	<0.001

3.2 Nursing Staff's Self-Directed Learning Ability

The Nursing Staff's Self-Directed Learning Ability Scores of nursing interns in the experimental group were 147.19±12.34, significantly higher than those of the control group (137.65±11.55). The difference was statistically significant ($P < 0.001$). See Table 2.

Table 2. Nursing Staff's Self-Directed Learning Ability Scores(points, $\bar{x}\pm s$)

Group	n	Self-Motivation Beliefs	Task Analysis	Self-monitoring and self-regulation	Self-Assessment	Total Score
Experimental group	55	61.82±4.31	25.64±2.42	41.91±3.64	17.82±3.73	147.19±12.34
Control group	55	58.73±3.22	23.35±2.76	39.83±3.72	15.74±2.56	137.65±11.55
t		2.745	2.163	1.856	2.413	3.467
P		<0.001	<0.001	0.003	<0.001	<0.001

3.3 Nursing Competency

The Nursing Competency Scores of nursing interns in the experimental group were 192.54±32.37, significantly higher than those of the control group (170.83±39.64). The difference was statistically significant ($P < 0.001$). See Table 3.

Table 3. Nursing Competency Scores(points, $\bar{x}\pm s$)

Group	n	Nursing Practice	Education and Consulting	Legal and Ethical Practice	Critical Thinking and Scientific Research
Experimental group	55	30.26±5.71	23.35±4.77	28.73±5.22	32.56±4.28
Control group	55	26.74±6.28	20.58±5.84	27.92±6.16	27.64±4.57
t		3.154	2.636	1.853	3.891
P		<0.001	<0.001	0.185	<0.001
Group	n	Professional Development Capabilities	Leadership	Interpersonal communication skills	Total Score
Experimental group	55	19.33±5.12	27.75±4.24	28.82±5.29	192.54±33.37
Control group	55	15.54±4.63	26.89±3.73	25.32±4.46	170.83±31.64
t		2.664	1.372	3.237	4.845
P		<0.001	0.271	0.011	<0.001

3.4 Teaching Effectiveness Satisfaction

The Teaching Effectiveness Satisfaction Rate of nursing interns in the experimental group was 98.18%, exceeding that of the control group (89.09%). The rank-sum test yielded $Z = -2.475$, $P = 0.014$. See Table 4.

Table 4. Teaching Effectiveness Satisfaction Rate [n（%）]

Group	n	Very satisfied	Satisfied	Dissatisfied	Total Satisfaction
Experimental group	55	40（72.73）	14（25.45）	1（1.82）	54（98.18）
Control group	55	31（56.36）	18（32.73）	6（10.91）	55（89.09）

4. Discussion

The DEDICT teaching model effectively integrates standard teaching components with scenario-based simulation, blending practice with theory. This approach allows for observation of each nursing intern's procedural details during practical sessions, thereby

achieving optimal teaching outcomes. The experimental group demonstrated significantly higher Theoretical and Practical Performance Scores than the control group. This improvement primarily resulted from instructors providing comprehensive and step-by-step demonstrations within the DEDICT framework while explaining relevant theoretical knowledge. Students then replicated standard procedures based on these demonstrations, making timely adjustments guided by instructors' real-time feedback. This approach effectively enhanced both specialized procedural skills and theoretical proficiency among nursing interns.

The experimental group demonstrated higher Nursing Staff's Self-Directed Learning Ability Scores than the control group, consistent with the findings of Wu et al., 2025. This outcome primarily stems from the DEDICT model, which provides increased hands-on opportunities, transforming monotonous instruction into diverse and engaging learning experiences. This approach stimulates interest, strengthens self-motivation, and enables trainees to self-regulate and evaluate their performance after receiving instructor feedback. Consequently, trainees proactively complete classroom tasks, thereby enhancing their autonomous learning capabilities. The experimental group also demonstrated higher Nursing Competency Scores than the control group, consistent with the findings of Wang et al., 2024, which is primarily because the DEDICT teaching model, combined with scenario simulation, enables nursing interns to perform clinical simulation procedures, experience authentic clinical environments, summarize practical insights during operations, learn clinical communication skills, and enhance their nursing practice and professional development. Through effective imitation and reflection during the learning process, it fosters critical thinking among nursing interns and elevates their job competency.

The teaching effectiveness satisfaction rate in the experimental group was higher than that in the control group, consistent with the findings of Yang et al., 2025. This outcome primarily stems from the DEDICT model's integration of scenario simulation. Through instructor demonstrations and explanations, nursing interns engage in imitation followed by immediate correction and assessment. This student-centred approach enhances both theoretical knowledge and practical skills, fostering independent learning abilities and job competency. Additionally, the dynamic learning atmosphere in classroom instruction effectively enhances teacher-student interaction and feedback, elevating nursing interns' positive learning experiences and thereby increasing their satisfaction with teaching outcomes.

5. Conclusion and Limitations

This study thoroughly examined the effect of the DEDICT teaching model, combined with scenario simulation, on operating room nursing interns. Results indicate that this teaching approach, through its unique instructional design and practical components, effectively improved interns' theoretical and practical performance, enhanced their self-directed learning abilities, increased their job competency, helped them adapt more effectively and rapidly to clinical nursing work, and elevated their satisfaction with teaching outcomes, which holds significant implications for nursing education.

This study retains the following limitations. First, the open nature of operating room teaching

environments, where interns knew their assigned groups and were instructed by fixed departmental faculty, precluded double-blinding; subjective preferences may have amplified intergroup differences, and performance bias, and social desirability bias may have occurred. Due to the busy nature of operating room work and staffing constraints, the outcome assessors in this study were not blinded third-party personnel. Despite implementing assessor training and standardized scoring criteria, detection bias may still have occurred. Second, the satisfaction questionnaire used in this study was self-developed. Although reviewed by experts, it did not undergo formal reliability and validity testing. Finally, it enrolled only operating room nursing interns from our institution, resulting in a small sample from a single hospital, which may limit the generalizability of the findings. Due to the transferability inherent in the DEDICT model's modular design, it can be extended to other clinical settings that require high-intensity skills and teamwork, such as emergency departments and intensive care units in other centers. By adapting simulation scenarios to the specific needs of different specialities, the theoretical implications and practical value of this study can be realized. Future research should adopt a high-quality design involving multiple centers and specialties, and large samples, to further validate the long-term effectiveness and scalability of this teaching model.

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Authors contributions

Peijun Xiang and Zhaohua Zou were responsible for study design and revising. Ping Lai and Zhuqing Chen were responsible for data collection. Peijun Xiang drafted the manuscript and Zhaohua Zou revised it. All authors read and approved the final manuscript.

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Competing interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Informed consent

Obtained.

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The Publication Ethics Committee of the Macrothink Institute.

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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