Scientific Research Publishing

Open Journal of Applied Sciences, 2025, 15(8), 2244-2254
https://www.scirp.org/journal/ojapps
ISSN Online: 2165-3925
ISSN Print: 2165-3917

Construction of BOPPPS-CBL Three-Stage and Six-Dimensional Teaching Model and Analysis of Learning Effect in Surgical Probation Teaching

Tianzi Qin[1,2,3*], Minyu Huang[1,3], Jie Liang[1#], Lifang Huang[1,3]

[1]Clinical Medical College of Youjiang Medical University for Nationalities, Baise, China
[2]Life Science and Clinical Medicine Research Center, Baise, China
[3]Department of Urology, Affiliated Hospital of Youjiang Medical University for Nationalities, Baise, China
Email: qintianzi35@126.com, #348793338@qq.com

How to cite this paper: Qin, T.Z., Huang, M.Y., Liang, J. and Huang, L.F. (2025) Construction of BOPPPS-CBL Three-Stage and Six-Dimensional Teaching Model and Analysis of Learning Effect in Surgical Probation Teaching. *Open Journal of Applied Sciences*, **15**, 2244-2254.
https://doi.org/10.4236/ojapps.2025.158148

Received: July 8, 2025
Accepted: July 28, 2025
Published: August 1, 2025

Abstract

Objective: To explore the application effect of BOPPPS combined with case-based learning (CBL) teaching method of three steps and six dimensions in surgical probation. **Methods:** From January to December 2023, 120 clinical medical students were randomly divided into the BOPPPS + CBL group (n = 60) and the traditional group (n = 60). The theoretical scores, skill scores, clinical diagnosis and treatment thinking, and teaching satisfaction were compared. **Results:** The BOPPPS + CBL group had significantly higher theoretical scores (86.27 ± 4.44 vs 82.80 ± 4.84), skill scores (87.30 ± 4.85 vs 83.53 ± 7.11) and clinical thinking scores (89.37 ± 4.23 vs 83.09 ± 6.25) than the traditional group ($P < 0.001$). In the comparison of teaching satisfaction, the BOPPPS + CBL group's teaching attitude (4.23 ± 0.83 vs 3.97 ± 0.49), content (4.13 ± 0.39 vs 3.90 ± 0.54), method (4.38 ± 0.49 vs 3.97 ± 0.41), effect (4.35 ± 0.48 vs 3.87 ± 0.39) and overall evaluation (4.22 ± 0.42 vs 4.0 ± 0.18) are superior to those of the traditional group ($P < 0.05$). **Conclusions:** The "goal setting, case integration and dynamic assessment" teaching model based on the three-order and six-dimensional BOPPPS-CBL model can promote students' clinical competence and teaching quality.

Keywords

BOPPPS Model, CBL Teaching Model, Surgery, Probation Teaching, Teaching Satisfaction

*First author.
#Corresponding author.

1. Introduction

Clinical probation teaching is an important activity to implement the organic combination of classroom teaching and clinical practice in clinical teaching, and the most fundamental purpose is to improve students' clinical thinking and ability to solve complex clinical problems [1]. Lecture-based learning (LBL) is dominated by teacher-led communication, and the teacher-centered teaching mode may cause students to lack initiative [2]. Case-based learning (CBL) centers on students' initiative in classroom teaching [3] [4], students' active exploration ability and teachers' adequate preparation for classroom teaching become the main conditions, and also affect the teaching effect [5] [6]. So in this mode BOPPPS (bridge-in, learning objective, pretest, participatory learning, posttest, and summary) mode is very important to explore. The author tries to construct the BOPPPS-CBL teaching three-step teaching framework: Based on the BOPPPS teaching framework, six-loop feedback closed-loop structure (guidance, goal, pretest, participatory learning, evaluation and summary), several characteristics of the CBL teaching model are combined. "Three steps (pre-teaching preparation stage - CBL integration stage - closed-loop evaluation stage)" and "six dimensions (teaching objectives, pre-testing, clinical cases, learning intervention, evaluation, meta-cognitive reflection and summary" were constructed to carry out the clinical probation teaching process, so as to improve the quality of clinical probation teaching, and gradually strengthen students' clinical skills and clinical practice teaching interest, so as to realize students' identity with clinical teaching activities and improve the clinical teaching model of clinical surgery.

2. Materials and Methods

2.1. Research Subjects

This study selected 120 undergraduate students majoring in clinical medicine from the class of 2019 who completed their surgical clerkship at the Affiliated Hospital of Youjiang Medical University for Nationalities between January and December 2023 as research subjects.

2.1.1. Inclusion Criteria

1) Third-year undergraduate students majoring in clinical medicine at the Youjiang Medical University for Nationalities, who have completed the theoretical courses of surgery. 2) Have not participated in any other surgical teaching reform projects. 3) Voluntarily participate in this study and sign the informed consent form. 4) Have no severe physical diseases or mental disorders, and can complete the entire internship and assessment.

2.1.2. Exclusion Criteria

1) Accumulated absence from classes due to illness or personal matters during the internship period exceeds 3 class hours. 2) Have previous experience in surgical clinical practice. 3) Withdraw from the study halfway or refuse to complete the

assessment and questionnaire.

2.2. Participant Selection and Randomization Method

2.2.1. Participant Selection

From January to December 2023, among the clinical medicine undergraduate students on surgical clerkship at the Affiliated Hospital of Youjiang Medical University for Nationalities, 135 students meeting the inclusion criteria were initially selected through the teaching management system. Then, 15 students were excluded based on the exclusion criteria (8 for excessive absences, 5 for previous surgical practice experience, and 2 for refusal to participate), leaving a final sample of 120 students.

2.2.2. Randomization Method

A simple randomization design was employed. A statistician not involved in the teaching process used SPSS 26.0 to generate a random sequence of numbers (1 - 120). The students were divided into two groups based on the odd and even numbers: odd numbers were assigned to the BOPPPS + CBL group (n = 60), and even numbers to the traditional group (n = 60). The random sequence was concealed in sealed envelopes, and neither the teaching staff nor the students knew the group allocation until all teaching and assessment were completed. The study protocol was approved by the hospital's Ethics Committee (Ethics Approval Number: 2024091901), and all participants were fully informed of the study's content and purpose, voluntarily participating in the experiment. The research complies with ethical standards, ensuring the protection of students' interests.

2.3. Research Methods

2.3.1. Framework of Experimental Design

A total of 120 clinical clerkship students of clinical medicine enrolled in 2019 were selected and randomly divided into the experimental group (BOPPPS-CBL mixed model group) and the control group (traditional teaching group). There was no significant difference in gender, age, and prerequisite course grades between the two groups of students, making them comparable ($P > 0.05$, Table 1).

Table 1. Comparison of baseline data between two groups of students ($\overline{x} \pm s$).

Group	n	Gender (Male/Female, n)	Age (years)	Average score of prerequisite courses (points)
BOPPPS + CBL	60	25/35	20.17 ± 0.83	81.23 ± 3.56
Traditional teaching	60	24/36	20.37 ± 0.86	80.91 ± 3.72
χ^2/t	-	$\chi^2 = 0.034$	$t = 1.325$	$t = 0.482$
P	-	0.853	0.188	0.631

2.3.2. Teaching Implementation Process

This study was a parallel controlled trial. During the teaching period, the subjects were strictly implemented according to the unified teaching quality standards, which mainly included the following four aspects: 1) the textbooks were unified, and the ninth edition of the Surgery textbook published by People's Medical Publishing House was used during the teaching period. 2) The number of class hours was unified, with 3 classes for each probation, a total of 9 times, and a total of 27 classes. 3) Unified teachers: 5 teachers conducted the teaching after unified training. 4) Base unification, subjects were taught in the same teaching base and the same clinical ward during the teaching.

1) Four-stage cycle teaching mode was adopted in the traditional teaching group:

1) Theoretical review stage (0.5 hours): using the form of multimedia-assisted teaching, combing the pathophysiological mechanism and clinical symptoms of related diseases, diagnosis and treatment points and other knowledge points, to build a perfect knowledge structure.

2) Bedside teaching stage (1.5 hours): Under the guidance of teachers, students carried out clinical practice training such as history collection of typical cases, physical examination and disease interpretation, focusing on clinical thinking and basic skills.

3) Case discussion stage (0.8 hours): Based on practice, case analysis and differential diagnosis thinking training were carried out to strengthen the ability of clinical judgment and problem-solving.

4) Summary and promotion stage (0.2 hours): through knowledge point review and formative evaluation feedback, promote the consolidation and improvement of knowledge.

2) The BOPPPS-CBL mixed teaching group adopted the three-step and six-dimensional teaching model:

1) Teaching preparation stage

① Setting of teaching goals: establishes three levels of goals according to SMART concept: knowledge dimension (KN), such as "can tell the knowledge points of ureteral calculi". Skill dimension (SK): such as "being able to correctly perform body surface examination". Attitude dimension (AT): such as "Learn to put yourself in others shoes and improve your communication skills".

② Pre-test evaluation: Multi-dimensional diagnostic evaluation includes cognitive level (Rain Classroom online test including multiple choice questions and case analysis). Skill level (standardized operation video assessment referring to OSCE scoring standards), and learning style (personalized learning profiles and dynamically adjust teaching strategies).

2) CBL integration stage

③ Case introduction: the situation introduction method based on problem-based learning (PBL) was adopted: video case presentation: emergency reception scene video was played. Case analysis: typical learning cases were introduced.

Leading questions: Design a chain of questions to guide thinking.

④ Deep participation: the implementation of the three-ring progressive teaching model: individual preparation: students in advance through the teaching case base to complete the basic learning. Group exploration: bedside teaching and peer evaluation were carried out by using the improved TBL model. Collective construction: case analysis was completed through the PAD classroom model (display-integration-discussion).

3) Closed-loop evaluation stage

⑤ Dynamic evaluation system: implement the "realtime-phase-medium-term" evaluation mechanism: real-time feedback: real-time monitoring by the classroom electronic response system such as Mentimeter. Phase: assessment of SP cases. Middle stage: Mini-CEX evaluation.

⑥ Metacognitive Summarization: Through targeted comparative analysis, present the processing procedures of typical cases, elaborate on the problem-solving approaches, and formulate subsequent learning plans. See Table 2 for details.

Table 2. The composition of the BOPPPS-CBL three-step and six-dimensional teaching model.

Teaching Stage	Dimensions Included	Specific Contents
Teaching preparation stage	1) Setting of teaching goals	Set knowledge, skills and attitude three-dimensional goals in accordance with the SMART concept.
	2) Pre-test evaluation	Diagnostic evaluation is conducted through the Rain Classroom online test (cognitive level), standardized operation video assessment (skill level), and personalized learning portfolio (learning style).
CBL integration stage	3) Case introduction	PBL-oriented scenario introduction: Play emergency reception videos, present typical cases, and design a chain of questions to guide thinking.
	4) Deep participation	Adopt the three-step progressive model of "individual preparation-group exploration-collective construction".
Closed-loop evaluation stage	5) Dynamic evaluation system	Implement a three-level evaluation system consisting of "real-time (classroom electronic response system)-stage (SP case assessment)-mid-term (Mini-CEX evaluation)".
	6) Metacognitive Summarization	Guide students to self-assess their learning process, and teachers provide guidance and feedback on knowledge internalization based on the assessment results.

2.4. Observation Indicators

In this study, multiple evaluation methods were used to evaluate the teaching through academic performance, clinical thinking and teaching satisfaction. The learning effect of the teaching model was comprehensively evaluated, and the teaching model could objectively and truly evaluate the improvement of students' comprehensive quality.

2.4.1. Comparative Analysis of Academic Performance

At the end of the probation course, the final examination of the two groups of

students was conducted, which consisted of theoretical examination and skill examination. The theoretical examination was conducted by closed-book examination, and the blind marking and scoring system was used to ensure the fairness and rigor of the examination results. The full score of the theoretical examination was 100. The skill assessment is mainly for the examination of surgical physical examination skills, and the full score is 100 points. It mainly tests students' ability of practical operation, so as to train students' comprehensive ability.

2.4.2. Clinical Diagnosis and Treatment Thinking Ability Assessment

In order to further test the practical effect of applying this mode to cultivate students' clinical diagnosis and treatment thinking ability, and to check whether it has achieved the purpose of cultivating students' ability, after the completion of the course, according to the routine steps of clinical practice case analysis in surgery, the main points of the course were comprehensively written according to the chief complaint, diagnosis, diagnostic basis, differential diagnosis, treatment principles, etc. After the two groups of students answered the questions, the teachers organized the examination and scoring with strict attitude and principles, and gave the evaluation on the spot, so that the evaluation was more fair and fair, and the full score was 100.

2.4.3. Teaching Satisfaction Survey and Analysis

Based on the BOPPOS teaching model, the questionnaire was designed and developed to comprehensively evaluate the satisfaction of medical students from four aspects: learning attitude, teaching content, teaching methods and teaching effect. The survey and evaluation were carried out in the form of an after-class questionnaire, which was strictly designed. In order to ensure the fairness and justice of the evaluation, Likert scale was used to score each item, and the score was calculated according to 5 points of very satisfied, 4 points of satisfied, 3 points of uncertain, 2 points of dissatisfied, and 1 point of very dissatisfied. The higher the value, the more recognition the medical students have for the teaching model. The reliability of the questionnaire was verified, and the Cronbach'sα was 0.8, which was consistent with the internal consistency.

2.5. Statistical Processing

SPSS26.0 software was used to fully analyze the data. The measurement data were expressed as $\overline{x} \pm s$, and the difference was tested by t test. $P < 0.05$ was considered statistically significant.

3. Results

3.1. Comparison of Examination Scores between the Two Groups of Students

The scores of theoretical examination and skill examination in the BOPPPS + CBL group were significantly higher than those in the traditional teaching group ($P < 0.05$, Table 3).

Table 3. Comparison of examination scores between the two groups ($\bar{x} \pm s$, score).

Groups	n	Theoretical examination results	Skill assessment results
BOPPPS + CBL	60	86.27 ± 4.44	87.30 ± 4.85
Traditional teaching	60	82.80 ± 4.84	83.53 ± 7.11
t		4.091	3.398
P		<0.001	0.001

3.2. Comparison of Clinical Diagnosis and Treatment Thinking Ability between the Two Groups

The clinical diagnosis and treatment thinking ability of the traditional teaching group was 83.09 ± 6.25, while the BOPPPS + CBL group was 89.37 ± 4.23. The BOPPPS + CBL group was better than the traditional teaching group ($t = 6.452$, $P < 0.001$).

3.3. Comparison of Students' Satisfaction with Teachers between the Two Groups

The scores of teaching attitude, teaching content, teaching method, teaching effect and overall satisfaction with teachers in the BOPPPS + CBL group were higher than those in the traditional teaching group ($P < 0.05$, Table 4).

Table 4. Comparison of students' satisfaction with teachers between the two groups ($\bar{x} \pm s$ score).

Groups	n	Teaching attitude	Teaching content	Teaching methods	Teaching effectiveness	Overall satisfaction
BOPPPS + CBL	60	4.23 ± 0.83	4.13 ± 0.39	4.38 ± 0.49	4.35 ± 0.48	4.22 ± 0.42
Traditional teaching	60	3.97 ± 0.49	3.90 ± 0.54	3.97 ± 0.41	3.87 ± 0.39	4.00 ± 0.18
t		2.146	2.705	5.048	6.051	3.693
P		0.034	0.008	<0.001	<0.001	<0.001

4. Discussion

With the rapid development of medical science and technology and the trend of integration of social disciplines, surgical teaching is also transforming from a single discipline knowledge to an interdisciplinary system of knowledge integration. It is necessary to cultivate medical talents who have comprehensive knowledge and can analyze and solve clinical problems using interdisciplinary knowledge. Interdisciplinary thinking and the method of problem analysis and problem solving are the challenges faced by modern surgical clinical diagnosis and treatment [7]. Therefore, this study creatively proposes interdisciplinary knowledge integration teaching, integrates teaching content into simulated clinical situation in the form of projects, and combines with project teaching to realize the transformation from theoretical teaching to in-depth practical teaching mode in practical opera-

tion [8] [9].

The results of this study showed that the three-step and six-dimensional BOPPPS-CBL teaching model can significantly improve the comprehensive level of surgical novice-students. The breakthrough point of this teaching model is that the whole teaching process is divided into "three steps", with clear steps within the "three-step" framework. ① In the teaching design stage, "teaching objective establishment" is carried out: objectives are proposed according to clinical competence standards, specific teaching objectives are set following the SMART principle (specific, quantifiable, achievable, time-bound, and evidence-based), and a "pre-evaluation" of previous surgical teaching models is conducted. Big data mining and analysis are used to accurately grasp students' basic knowledge level and learning needs, enabling personalized training to address the shortcomings of traditional models. ② In the CBL integration stage, "introduction" is implemented with VR technology to create realistic clinical scenarios, focusing students' attention and stimulating interest; teaching objectives are aligned with clinical position requirements to guide targeted practice. During "participation", teamwork learning is conducted through face-to-face discussions and case analysis, enhancing learning efficiency, teamwork, and problem-solving abilities. ③ In the "closed-loop evaluation" stage, "dynamic evaluation" is introduced, including real-time (in-class electronic response systems), phased (SP case assessments), and mid-term (Mini-CEX) evaluations, ensuring comprehensive and objective feedback [10]. Students are guided to self-evaluate and reflect on their learning, facilitating knowledge internalization. This "three-step and six-dimensional" framework avoids scattered teaching processes and delayed effect inspection in traditional CBL, establishing a mature system that clarifies learning directions and enables personalized teaching [11].

The model proved superior, with significantly higher scores in theory and skill tests than the traditional group ($P < 0.001$). Students demonstrated deeper knowledge understanding, shifting from passive to active learning, and the model transformed education from teacher/textbook-centered to student-centered. Thanks to problem-based learning, they actively connected knowledge during case analysis, forming systematic knowledge structures [12]. In skill tests, their proficiency and clinical thinking were stronger, attributed to virtual surgical training systems that simulate clinical scenarios for repeated practice of thinking and decision-making abilities [13]. In clinical diagnosis and treatment thinking assessments, the experimental group showed greater depth and breadth ($P < 0.05$), with abilities to systematically analyze complex clinical manifestations, conduct multi-angle and interdisciplinary diagnosis, and judge diagnostic and treatment bases, as well as stronger clinical adaptability and problem-solving skills, laying a solid foundation for future practice.

The BOPPPS-CBL group scored significantly higher in teaching satisfaction ($P < 0.05$) across teaching attitude, content, methods, and effect. Teaching attitude: Teachers acted as "guides" and "facilitators", respecting individual differences and

focusing on learning needs to create a positive atmosphere. Teaching content: Closely integrated clinical cases with theoretical knowledge and the latest research, enhancing practicality and helping students recognize the clinical value of knowledge. Teaching methods: Combined cases, discussions, role-play, and online-offline hybrid teaching, improving enthusiasm and cultivating independent, critical thinking. Teaching effect: Students' knowledge mastery, clinical operation, and diagnostic thinking improved significantly, boosting satisfaction [14].

Limitations of the study: 1) Single-center study: This research was conducted only at Youjiang Medical University for Nationalities, with a single source of samples. It may be influenced by the characteristics of medical education in the region, and the generalizability of the results is limited. 2) Insufficient long-term follow-up: Only the effect at the end of the clerkship was evaluated, without long-term follow-up (such as performance during the internship stage), making it impossible to verify the impact of this model on students' long-term clinical abilities. 3) Potential Hawthorne effect: Students were aware of participating in the teaching reform research, and may have performed more actively due to increased attention, leading to biased results.

5. Conclusion

In conclusion, as a new teaching model, BOPPPS-CBL three-step and six-dimensional teaching method can play a great role in surgical practice and achieve good teaching effects. The innovation of the author's research is not only the integration of the teaching model on the basis of three orders and six dimensions, but also the use of the most advanced educational technology in all aspects of teaching practice, and the effective verification of evidence through research. At the same time, this model can also provide a basis for the innovation and implementation of various teaching methods in medical education in the future, and make a big step forward in promoting the cultivation of high-quality medical talents with interdisciplinary knowledge integration ability and clinical practice ability in medical education. Of course, the teaching model and methods need to be constantly polished in practice. In the future research, the changes of teaching content and scene can be further discussed on the basis of this model, and the quality control and evaluation of how to implement the process can make the teaching activities more smoothly and deeply develop in the teaching reform of surgery.

Funding Projects

1) 2022 Youjiang Medical University for Nationalities School-level Educational Teaching Reform Regular Project (J2022-10);

2) 2022 Guangxi Higher Education Undergraduate Teaching Reform Project (2022JGB298).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Yang, W., Zhang, X., Chen, X., Lu, J. and Tian, F. (2024) Based Case Based Learning and Flipped Classroom as a Means to Improve International Students' Active Learning and Critical Thinking Ability. *BMC Medical Education*, **24**, Article No. 759. https://doi.org/10.1186/s12909-024-05758-8

[2] Trullàs, J.C., Blay, C., Sarri, E. and Pujol, R. (2022) Effectiveness of Problem-Based Learning Methodology in Undergraduate Medical Education: A Scoping Review. *BMC Medical Education*, **22**, Article No. 104. https://doi.org/10.1186/s12909-022-03154-8

[3] Harriel, K.L. and Parboosingh, J.T. (2020) Improving Pediatric Problem-Based Learning Sessions in Undergraduate and Graduate Medical Education. *Current Opinion in Pediatrics*, **32**, 832-836. https://doi.org/10.1097/mop.0000000000000962

[4] Sun, Q., Pang, Y., Liu, X., He, M., Dong, J. and Xie, J. (2024) Enhancing General Surgery Clerkships: The Application and Value of Standardized Patient-Based Situational Simulation Teaching. *Cureus*, **16**, e60845. https://doi.org/10.7759/cureus.60845

[5] Cen, X.Y., Hua, Y., Niu, S., *et al.* (2021) Application of Case-Based Learning in Medical Student Education: A Meta-Analysis. *European Review for Medical and Pharmacological Sciences*, **25**, 3173-3181.

[6] Ferrer Valencia, V., Rivera Gonzales, H., Ortiz Llinás, J.R. and Cardona Ortegón, J.D. (2023) Case-Based Learning: An Immersive and Effective Educational Approach. *Academic Radiology*, **30**, Article ID: 2797. https://doi.org/10.1016/j.acra.2023.09.003

[7] Sathe, T.S., L'Huillier, J.C., Moreci, R., Lund, S., Brian, R., Silvestri, C., *et al.* (2024) Reimagining General Surgery Resident Selection: Collaborative Innovation through Design Thinking. *Surgery Open Science*, **19**, 223-229. https://doi.org/10.1016/j.sopen.2024.05.006

[8] Lu, L., Wei, S., Huang, Q., *et al.* (2023) Effect of "Internet + Tertiary Hospital-Primary Hospital-Family Linkage Home Care" Model on Self-Care Ability and Quality of Life of Discharged Stroke Patients. *American Journal of Translational Research*, **15**, 6727-6739.

[9] Mirbahai, L., Noordali, F. and Nolan, H. (2024) Designing an Interdisciplinary Health Course: A Qualitative Study of Undergraduate Students' Experience of Interdisciplinary Curriculum Design and Learning Experiences. *Journal of Medical Education and Curricular Development*, **11**, 23821205241260488. https://doi.org/10.1177/23821205241260488

[10] Liu, Y., Lian, X., Chen, X., Zeng, M., Yin, Y. and Lin, J. (2024) Practical Exploration of BOPPPS Model Combined with Situational Teaching Method in Clinical Training of Intensive Medicine: Novel Pedagogy and Perception. *Frontiers in Medicine* (*Lausanne*), **11**, Article ID: 1442099. https://doi.org/10.3389/fmed.2024.1442099

[11] Xu, L., Lin, C., Hou, C. and Li, S. (2025) The Combined BOPPPS and CBL Teaching Method Enhances Students' Learning in Pathology Experimental Course. *Advances in Physiology Education*, **49**, 526-534. https://doi.org/10.1152/advan.00154.2024

[12] Yang, W., Li, H., Su, A. and Ding, L. (2023) Application of Problem Based Learning (PBL) and Case Based Learning (CBL) in the Teaching of International Classification of Diseases Encoding. *Scientific Reports*, **13**, Article No. 15220. https://doi.org/10.1038/s41598-023-42175-1

[13] Zhou, F., Sang, A., Zhou, Q., Wang, Q.Q., Fan, Y. and Ma, S. (2023) The Impact of an Integrated PBL Curriculum on Clinical Thinking in Undergraduate Medical Stu-

dents Prior to Clinical Practice. *BMC Medical Education*, **23**, Article No. 460. https://doi.org/10.1186/s12909-023-04450-7

[14] Wang, S., Wu, Z., Chen, J., Zhang, M., Sun, L., Yan, D., *et al.* (2025) Application of a Dual-Track Teaching Model Combining CBL and TBL Based on the BOPPPS Model in Trauma Care Nursing Training. *Nurse Education in Practice*, **84**, Article ID: 104295. https://doi.org/10.1016/j.nepr.2025.104295