

Evaluation of the Application Effect of Short Video Combined with BOPPPS Teaching Mode in Clinical Anesthesia Teaching

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Abstract: *Objective:* To study the application effect of short video combined with BOPPPS teaching mode in clinical anesthesia practice. *Method:* 48 students assigned to clinical anesthesia in digestive endoscopy of Shanxi Bethune Hospital from July 1, 2022 to April 1, 2023 were selected as research objects. They were randomly divided into the control group (PowerPoint presentation teaching group) and the observation group (short video combined with BOPPPS teaching group), with 24 students in each group. After the internship, the students' theoretical and technical scores were tested, the effects of the two teaching modes were compared, and the students' satisfaction was investigated. *Results:* The test scores of students in the observation group were significantly better than those in the control group ($P < 0.05$). The short video combined with BOPPPS teaching mode can significantly improve students' learning interest, operation skills, and memory ($P < 0.05$). The students' satisfaction in the observation group was higher than that in the control group ($P < 0.05$). *Conclusion:* In clinical practice, the application of short video combined with BOPPPS teaching mode has achieved great effect, which is worth further promotion and research.

Keywords: Short video combined with BOPPPS teaching model; Clinical teaching of anesthesia; Teaching effect; Teaching evaluation

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1. Introduction

Anesthesiology is a professional and operational applied course, and the clinical practice stage of anesthesiology is the key link to training students' clinical thinking, clinical skills, and doctor-patient communication. Flexible clinical teaching methods are necessary due to heavy anesthesia clinical work and short study time. Clinical practice is usually centered on patients and teachers, with students often in a passive role, lacking initiative and

prone to fatigue ^[1]. Anesthesia practice involves many operation contents and a fast rotation pace. Even with standard operation norms, it is difficult for teachers to guarantee the homogenization of operation, and students from different majors and educational backgrounds also experience distinct internship effects ^[2]. Students majoring in non-anesthesia often have a poor sense of accomplishment with less class time, a weak theoretical foundation, and difficulty in being taught. Therefore, the issues of completing high-quality clinical teaching during busy work and limited hours, promoting the combination of theory and practice, and improving the effect of clinical practices have always been concerned about and discussed by experts ^[3,4].

The interactive BOPPPS teaching model, which emphasizes student-oriented teaching, includes six steps: bridge-in, objectives, pre-assessment, participatory learning, post-assessment, and summary. This teaching model has changed the traditional “infusing” classroom teaching method ^[5,6] and has achieved positive teaching results during the epidemic period ^[7,8]. However, its application in clinical practice still faces some limitations, such as insufficient image, time-consuming, and low efficiency.

Short video teaching exhibits the characteristics of high efficiency and convenience, high interaction, vivid image, and strong interest, which is of great significance for improving the effect of clinical anesthesia teaching ^[9]. This paper studied the application effect of the short video combined with BOPPPS teaching mode in clinical anesthesia teaching, providing guidelines for teaching hospitals and residential training bases.

2. Research objects and methods

2.1. Research objects

48 students assigned to clinical anesthesia in digestive endoscopy room of Shanxi Bethune Hospital from July 1, 2022 to April 1, 2023 were selected as the study objects, including 18 graduate students in non-anesthesia majors and 30 graduate students in anesthesia majors. The random number table method was used to divide them into the control group (PowerPoint presentation teaching group) and the observation group (short video combined with BOPPPS teaching group), each with 24 students. All subjects provided informed consent. There was no significant difference in age, gender, educational background, and internship duration between the groups ($P > 0.05$). Each group was taught by the same deputy chief anesthesiologist.

2.2. Research methods

Students in the control group adopted the traditional teaching mode. Before class, the students previewed the textbooks. During the theoretical teaching process, PowerPoint presentations were used to list and explain the knowledge points one by one in words, and pictures were inserted to facilitate understanding. Clinical teaching was explained during practice, and interns followed the teacher’s guidance and procedures to practice.

The students in the observation group adopted a combination of anesthesia practical short video and BOPPPS teaching mode. Short videos related to clinical teaching content were prepared before class, and the students watched the short videos in advance to have an intuitive feeling of anesthesia practice. The theoretical teaching content was the same as that of the control group, and BOPPPS teaching mode was adopted in the teaching process. Clinical teaching was explained during practice, with interns following the teacher’s guidance and procedures for hands-on practice.

The two groups were given 2-week clinical teaching of endoscopic anesthesia. After the teaching, they were assessed and evaluated, the scores of theoretical and clinical skills were recorded, and the teaching effect and student satisfaction were investigated.

2.3. Teaching methods

The control group adopted the traditional teaching mode. In the teaching process, PowerPoint presentations were employed to list and explain the knowledge points through text. To enhance comprehension, pictures were occasionally inserted. The teacher first reviewed the theoretical knowledge and anesthesia operation precautions, and then the intern entered the gastroscopy room to observe and practice the anesthesia process.

The observation group adopted the teaching method combining anesthesia short video and BOPPPS teaching mode. In the pre-class preparation stage, 8 videos of painless gastroenteroscopy practice were recorded in advance with teachers and students. The videos included hand hygiene and hospital awareness requirements, patient assessment, provision of narcotic drugs, anesthesia procedures, tracheal intubation, use of monitors and anesthesia machines, management of accidents such as hypoxia and hypotension, and criteria for recovery and discharge. The specific steps of the teaching method combined with the BOPPPS teaching mode are as follows:

- (1) Introduction (Bridge-in): The day before the practice class, the teacher sent the short video of the anesthesia case for the students to watch, raised the questions related to teaching, and then explained them one by one.
- (2) Objective: The learning objective was clarified to students before elaborating on the course content.
- (3) Pre-assessment: Questions related to previous knowledge were selected for the pre-test to understand students' pre-class mastery and knowledge reserve level.
- (4) Participatory learning: Heuristic teaching methods were adopted in the teaching process to guide students to actively think and analyze internal laws.
- (5) Post-assessment: After the completion of the class, the theory and skills assessment were carried out to understand the learning effect of students; while the teaching satisfaction evaluation scale was used to understand the teaching effect.
- (6) Summary: Teachers helped students to integrate the knowledge points, and arranged the content and short videos for the next class for students to carry out course preview.

2.4. Evaluation method

After 2 weeks of teaching with objective evaluation method, theoretical test (40 points for short answer questions related to basic theoretical knowledge and 20 points for essay questions related to clinical case analysis, 60 points in total) and clinical skill test (10 points for each patient assessment, painless gastroenteroscopy anesthesia operation, tracheal intubation, respiratory depression treatment, etc., 40 points in total) were adopted, with a total score of 100. Grades were given by the teaching secretary, and teachers were not involved in setting the questions and marking the papers.

For subjective evaluation method, anonymous questionnaire survey was conducted on teachers and students. Teachers' evaluation involved whether the teaching mode exerted teaching effects such as ease of memorization, improvement of learning interest, improvement of practical skills and clinical thinking. Students' evaluation involved their satisfaction with the teaching mode.

2.5. Statistical methods

SPSS22.0 software was used to analyze and process the data. The measurement data were expressed as mean \pm standard deviation (SD). The *t*-test was used for measurement data, the χ^2 test was used for counting data, and the *t*-test of two independent samples was used for comparison between groups. The difference was considered to be statistically significant if $P < 0.05$.

3. Results

3.1. Objective evaluation results

The theoretical and skill test scores of students in the observation group were significantly better than those in the control group, $P < 0.05$, as shown in **Table 1**.

Table 1. Comparison of theoretical and skill test scores of internship students in the two groups (score, $\bar{\text{mean}} \pm \text{SD}$)

Group	<i>n</i>	Theoretical score	Skill score	Total scores
Control group	24	47.08 ± 3.41	29.42 ± 2.08	76.50 ± 5.28
Observation group	24	52.78 ± 3.57	34.50 ± 2.55	87.38 ± 5.61
<i>t</i>		5.658	7.556	6.914
<i>P</i>		0.000	0.000	0.000

Note: Theoretical score 60 points; Skills score 40 points; Total score 100 points

3.2. Evaluation of teaching effect

After the 2-week practice, the short video combined with BOPPPS teaching mode in the observation group helped to improve students' learning interest, practical skills, and memory, and the differences were statistically significant ($P < 0.05$). There was no statistical significance in the improvement of clinical thinking skill between the two groups ($P > 0.05$), as shown in **Table 2**.

Table 2. Evaluation of teaching effect of the teaching modes of two groups

Evaluation item	Control group (n = 24)			Observation group (n = 24)			χ^2	<i>P</i>
	Yes	Average	No	Yes	Average	No		
Easy to remember	12	6	6	20	3	1	6.000	0.014
Enhancing learning interest	10	8	6	21	2	1	11.021	0.001
Improving practical skills	12	5	7	21	2	1	7.855	0.005
Improving clinic thinking	15	6	3	19	3	2	1.613	0.204

3.3. Student satisfaction evaluation

As presented in **Table 3**, students in the observation group had higher satisfaction than those in the control group ($P < 0.05$).

Table 3. Satisfaction rate of students from two groups [n (%)]

Group	Very satisfied	Satisfied	Average	Unsatisfied	Total satisfaction rate
Control group (n = 24)	8 (33.33)	7 (29.17)	8 (33.33)	1 (4.17)	15 (62.50)
Observation group (n = 24)	10 (41.67)	11 (45.83)	3 (12.50)	0	21 (87.50)
χ^2					4.000
<i>P</i>					0.046

4. Discussion

4.1. Short video combined with BOPPPS teaching mode can effectively improve teaching effect

With the vigorous development of teaching reform, a variety of teaching modes have emerged, such as Problem-Based Learning teaching method, Case-Based Learning teaching method, simulation-based medical teaching method, segmented teaching method, etc. Each teaching method has its own advantages and disadvantages, but they all emphasize the “student-oriented and teacher-assisted” concept and exert subjective initiative to improve learning efficiency^[10-12].

The educational ideology of the new era puts forward the requirement of student-oriented education, allowing students to learn independently with the help of new media resources, so as to realize the teaching mode of “learning before teaching” under the new educational ideology, enable students to truly participate in learning and realize the cultivation and development of learning ability, and help them better promote the awareness and ability of lifelong learning. Participatory teaching method is an experiential teaching approach that addresses the disadvantages of dull, awkward, and challenging classroom teaching. The creation of short video teaching content with the participation of teachers and students helps to enhance emotional communication and improve teaching effect, and comments and discussions can cultivate and improve critical thinking skills^[13,14].

This study shows that students adopted short video combined with BOPPPS teaching mode have higher satisfaction, stronger initiative, and less burnout. Short videos convey teaching difficulties and key points in advance, saving teachers’ time and improving teaching efficiency. However, students’ clinical thinking skill needs to be improved. Teachers should keep pace with the times, learn from each other, and develop diversified teaching programs.

4.2. Short video combined with BOPPPS teaching mode can effectively improve students’ job competency

BOPPPS teaching mode can effectively improve students’ classroom participation, enhance students’ learning motivation, and cultivate students’ independent thinking and learning. However, the BOPPPS interactive model may be more suitable for small-scale clinical teaching rather than large-scale teaching^[15], and due to the influence of teaching venues, time, epidemic, and other factors, the improvement of clinical anesthesia practice capability is limited.

This study showed that short video combined with BOPPPS teaching mode significantly improved students’ learning interest and practical skills, promoted the convergence and integration of knowledge points, and produced significantly better results than the control group in both theoretical and technical tests. With busy clinical practice and heavy learning pressure, students can make use of fragmented time and network resources to watch short video teaching content in advance, which is more intuitive, conducive to the understanding and memory of theoretical knowledge, and helps to combine basic knowledge with practical skills to rapidly improve job competency^[16,17].

4.3. Short video creation can effectively improve practical teaching

Internet-based teaching continues to emerge with the popularity of short videos, and with the impact of the COVID-19 pandemic, distance teaching models such as short videos have become an innovative teaching approach. The features of short videos such as “like,” “comment,” and “forward” can give full play to students’ subjectivity and facilitate the exchange and communication between teachers and students. Teachers can timely

adjust the educational content according to students' feedback to achieve better education effect^[18]. Short video is a new carrier of knowledge transmission that requires highly condensed content and is interesting and easy to spread. The network platform facilitates both online and offline interaction, allowing classes to complement each other and integrate seamlessly^[19,20].

The standardized practical video is more conducive to the homogenization of teaching, aiding students in imitation and providing a consistent teaching guideline for teachers. This study found that video recording with the participation of students can also improve students' self-reflection and error correction, and help students to learn from each other. Short teaching videos help experienced internship students effectively teach new students, thus saving the teacher's time, facilitating interaction between students, and improving the satisfaction between teachers and students.

However, the short videos should highlight the key points and simplify the content, with a key content corresponding to a short video, so that students can learn on demand and watch and review repeatedly.

5. Conclusion

To sum up, the short video combined with BOPPPS teaching mode in this study has been used in the teaching of anesthesia clinical practice with positive results. However, due to the impact of COVID-19 on students' clinical practice, the sample size included in this study was small, and the effect of students' practice in painless endoscopy was mainly observed. In the future clinical practice teaching, we will enrich short video teaching materials, promote the application of this teaching model to non-anesthesia majors and undergraduates, improve the efficiency of clinical teaching, and observe the long-term impact of this teaching method on students.

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Author contributions

X.H. and L.N. were involved in project design, implementation, and writing. B.H., J.X., and H.H. contributed to teaching management and implementation. H.L. was responsible for data collection and analysis.

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