

SURGICAL COMPETENCE TRAINING USING PROJECT-BASED LEARNING METHOD WITH THE MOST RECENT ADVANCED EDUCATIONAL TECHNIQUES

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SUMMARY

Objectives: Could project-based learning method favor the maximization of trainees' surgical competence development?. Our study evaluated the effectiveness of this method together with the most recent advanced educational techniques as a pedagogical strategy in surgical technique teaching at Vietnam Military Medical University. Subjects and methods: Twenty trainees were divided into two groups: Group 1: 10 experienced surgeons with proficiency use of English. Group 2: 10 unexperienced technicians with unproficiency English. Both subjects underwent the project-based learning method (10 cases of intestinal transplant per group) with advanced educational techniques such as: video-based, stimulation-based, internet-based... Surgical competence of all trainees were assessed before and after the course according to the "Surgical Competence and Performance" guideline of Royal Australasian College of Surgeons. Results: Before the course, the competence of trainees in group 1 were significantly higher than that in group 2. But the development of surgical competence in group 2 was higher than in group 1 and the competence achievement in both groups were not different after the course. All of trainees could perform intestinal transplant successfully from the 5th - 10th in this training course. Conclusion: Project-based learning method gratefully favors the maximization of trainees' surgical competence development, particularly for inexperienced technicians with unproficiency English. This method motivated and arouse interest, facilitated the understanding and memorization of the steps for procedure implementation, benefiting the trainees' performance.

** Keywords: Project-based learning; Surgical competences; Educational techniques.*

INTRODUCTION

In early 20th century, American pedagogy built theory of the project-based learning (PBL - Project-based learning) which was considered to be a teaching method to implement learner-oriented teaching. The PBL approach in medical education has been regarded as the most significant educational innovation in the past four

decades. PBL is by now a well-established method of learning and instruction. But, could PBL method favor the maximization of trainees' surgical competence development?. Our study aimed: *To evaluate the effectiveness of this method together with the most recent advanced educational techniques as a pedagogical strategy in surgical technique teaching at Vietnam Military Medical University.*

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SUBJECTS AND METHODS

1. Subjects.

Twenty trainees were divided into two groups. Group 1 included 12 experienced surgeons with proficiency use of English whereas group 2 consisted of 10 inexperienced technicians with English unproficiency. Selection of the study subjects was done using simple sampling and according to the division of trainees introduced by 103 Military Hospital with no personal involvement or comments in special circumstances. Therefore, the selection of trainees as 1 or 2 groups was random. From the total study population, two trainees in group 1 were excluded from the study because of absences in pre-test evaluation.

2. Methods.

This study was a prospective interventional study.

Both two groups underwent the PBL method on selected subjects being intestinal transplantation. In planning PBL approach, we used the most recent advanced educational techniques such as: Video-based, simulation-based, internet-based. Each group was trained for 10 days and practiced 10 cases of experimental intestinal transplant. Surgical competence of all trainees were assessed before and

after the course according to the “Surgical Competence and Performance” guideline of Royal Australasian College of Surgeons using a pre-course test at the beginning and a post-course test at the end of course. Each test included 70 multiple choice questions (response time was 60 minutes) and a direct observation of procedures - surgical. Scores obtained from these tests were assessed and analyzed in statistical software SPSS and statistical tests using paired t-test and independent t-test.

RESULTS

In the group 1, pre-test mean score was 28.75 ± 1.69 (range: 26.00 - 31.50) and in the group 2, it was 17.75 ± 1.18 (range: 16.50 - 19.50). The comparison in the pre-test scores between the two groups by independent t-test showed that the group 1 achieved better results than the group 2 which was statistically significant ($p < 0.05$).

In the post-test evaluation, the mean score of the group 1 was 39.90 ± 2.73 (range: 34.00 - 43.00) and 33.05 ± 1.07 in the group 2 (range: 31.50 - 34.50). The comparison between two groups regarding the mean score of the post-test exam through independent t-test revealed that the group 1 was slightly better than the group 2 but their difference was not statistically significant ($p = 0.55$).

Table 1: Mean scores in pre-course and post-course test of two groups.

Group	The pre-test mean scores	The post-test mean scores	p
Group 1	28.75 ± 1.69 (26.00 - 31.50)	39.90 ± 2.73 (34.00 - 43.00)	$p = 0.02$
Group 2	17.75 ± 1.18 (16.50 - 19.50)	33.05 ± 1.07 (31.50 - 34.50)	$p = 0.01$
p	$p = 0.03$	$p = 0.55$	

In the group 1, the comparison between the pre-test and post-test scores by paired t-test showed that an average score of 11.20 ± 3.15 was added the pre-test exam score which was statistically significant ($p = 0.02$). In the group 2, it was 15.30 ± 1.51 , which was significant ($p = 0.01$).

In practice, all of trainees could perform intestinal transplant successfully from the 5th to the 10th case in this training course.



Picture 1: The sixth intestinal transplant case of group 1.



Picture 2: The sixth intestinal transplant case of group 2.

DISCUSSION

According to George Lucas Educational Foundation (2001), theoretical studies have shown that project-based teaching in schools can encourage students to learn, minimize dropouts, promote cooperative skills and improve learning efficiency. For

students, the benefits are provided by project-based teaching include: (a) Increasing students' diligence, improving self-reliance and learning attitudes [4]; (b) Knowledge that students acquire is equivalent to or more than other teaching models, as students participating in the project will be more responsible for learning than their involvement in other traditional activities [1]; (c) Students have the opportunity to develop higher-order thinking, problem-solving, cooperation and communication competencies (SRI, 2000); (d) with this method of teaching, students who participate in life activities often feel more meaningful beyond the classroom. From such practicality, projects will appeal to students and attract students [3].

At Vanderbilt University (CTGV), the awareness and technology group organized the projects and evaluated the results of students through the exercise, the results showed that (a) Students made significant progress in design capacity; (b) Students made significant progress when doing multiple-choice exercises with content related to concepts [5].

Tretten R and Zachariou had conducted this method and assessed at 4 primary schools, including interviews with teachers and parents. The two authors found that students, both working individually and in groups feel more confident when they have a habit of working effectively and applying methodological thinking to solve problems by searching or create a plan to deal with appropriate projects [7].

Imanieh M.H et al studied the effectiveness of two teaching methods, namely traditional one and PBL one, on 120 undergraduate medical students referred to the Pediatric Gastroenterology Ward of Nemazee Hospital. The results showed that students could benefit much from the latter by actively involving in the process of teaching and evaluation, thereby they achieved the higher results than the former [6].

According to Nguyen Van Cuong's study (2009), the theory of modern teaching, University of Potsdam, Germany-Hanoi, the teaching method can develop the capabilities as well as the ability to solve complex problems, collaborative working capacity and assessment capacity [1].

In our study, comparison between pre-test and post-test mean scores of the group 1, the results showed that the mean scores for the group 2 was 4.10 point higher than that of the group 1, the difference was statistically significant ($p = 0.03$). We can emphasize that project-based teaching methods are suitable for many different students, especially for students who are inexperienced and unproficiency at English, where they can learn by themselves with advanced educational techniques such as videos based, internet-based, simulation-based...

CONCLUSION

Project-based learning method gratefully favors the maximization of trainees' surgical competence development, particularly for inexperienced technicians with English unproficiency. This method motivated and arouse interest, facilitated the understanding and memorization of the steps for procedure implementation, benefiting the trainees' performance.

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