

The Influence of Diversified Teaching Methods Combined with Flipped Classroom and Nurse Assistant on Nursing Education

Qin Huang^{1,2,*}

¹Department of Nursing, Affiliated Hospital of Nantong University, 20th Xisi Road, Nantong, 226001, China

²Department of Neurosurgery, Affiliated Hospital of Nantong University, 20th Xisi Road, Nantong, 226001, China

*corresponding author

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Abstract: The purpose of the study is to investigate the effect of various teaching methods combined with flipped classroom and nurse assistant on nursing education. In this study, the control group received teaching through traditional teaching methods, while the experimental group adopted the diversified teaching methods with flipped classroom and nurse assistant. The term of study is one semester. At the end of the semester, two groups of students took OSCE examinations and conducted a survey of course satisfaction. In the OSCE examination, all the scores in the experimental group was significantly higher than those in the control group. ($p < 0.001$) In the course satisfaction survey, all the evaluations of the experimental group were significantly higher than those of the control group. ($p < 0.001$) Thus, the diversified teaching methods combined with flipped classroom and nurse assistant can help students put knowledge into practice and consolidate theoretical knowledge and improve practical ability.

1. Introduction

Nursing is a specialty that combines theory with practice and It requires the practical ability and comprehensive ability of students. In the past few decades, the health care environment has undergone significant changes.^[1] So our educational environment should also be changed accordingly. However, many nursing teaching still depends on traditional teaching methods which is teacher-centered teaching method.^[2] In traditional teaching methods, the majority of students are in the position of passive learning. On the contrary, teachers play a leading role in the classroom and impart knowledge to students in an indoctrinating way. As time passes, the interesting of students and motivation will reduce in learning.^[3] Moreover, this mode of teaching communication may also lead to students not actively participating in knowledge processing, understanding knowledge or transforming theory into practice.^[1] These situations are not conducive to the development of nursing students in the long term. Thus, it is necessary to change and change the current nursing teaching methods in order to make nursing students develop better in today's complex medical environment.

The change of this teaching mode not only needs to change the traditional teaching concept, but also needs to change the traditional role of the classroom, that is, students become the main task of the classroom. This change can effectively reduce the negative impact of passive learning when students participate in learning activities as classroom leaders.^[4-9] Not only that, student-centered teaching mode is beneficial for students to become active learners.^[10-12]

The flipped classroom is such a kind of teaching change that can change the centralized lecture into student-centered lecture by changing the classroom form, so that students are responsible for active learning of curriculum information in the classroom.^[13] The flipped classroom was first proposed by two high school chemistry teachers, Jonathan Bergman and Aaron Sams.^[14, 15] In the flipped classroom model, the content presented in the traditional classroom is assigned to students as homework before class. In the classroom time, students participate in active learning, such as group discussion, case analysis and simulated practice activities.^[16] Flipping classroom teaching method can help students transition from passive learning to active and autonomous learning, improve their ability of analysis, integration and critical thinking, and better adapt to the changes of contemporary medical environment.^[17] At present, this teaching method has been widely implemented and studied in many disciplines.^[18-27]

Nurse assistant is an intelligent APP, which integrates platform, resources and services. Students can use the sub-functions of online video viewing, learning progress viewing, completion of related assignments, participation in course answering and discussion. Teachers can use the sub-modules of learning process management provided by the platform of curriculum setting, course resource management, course assignments, course answering and discussion. Nurse assistants are easy to operate, and users can use them on mobile phones, tablets and laptops. At the same time, the background statistics of nurse assistants are more detailed and accurate, there are many items to evaluate the performance of students, and the results are more reasonable and scientific. This platform will scientifically manage learning behavior of students, make up for the "blank" that teachers can't supervise the learning of students after class. This platform will make more detailed and accurate statistics on the learning process data of students, and help teachers scoring and evaluating students more objectively and accurately.

There have been many achievements in many disciplines, however, there are still many problems in the implementation of flipped classroom due to the differences between countries or cultures. Thus, this study hopes to combine the flipped classroom model with Nurse Assistant through this experiment, then to explore a suitable teaching model for ourselves, and provide a new vision and way for the future teaching reform.

2. Methodologic Approach

2.1. Participants and Setting

Participation recruited from undergraduate nursing interns in our hospital. A total of 96 students participated in the study. By random sampling, 48 students were included in the control group and 48 students in the experimental group. Data were collected August 2018 through July 2019, from a convenience sample of nursing students (N = 96) as they completed their first semester course.

2.2. Design

During the course of study, In the control group, traditional teaching was adopted, and the teaching form was the theory teaching and operation demonstration of the instructor. In the experimental group, the flipped classroom mode was adopted, and the whole experimental process consists of four stages. In the preparatory stage, the students in the experimental group were divided into eight groups, and

each groups consist of six students. Choose a group leader in each group to manage the group and contact the teacher.

In the pre-class stage, teachers release courseware related to the course one week in advance through nursing assistants in the form of homework, so that nursing students can do a good job of combing relevant theoretical knowledge and case analysis. According to the requirements of the teachers, the students study the relevant teaching videos carefully. During the study period, students in each group can discuss and learn by reading books, using libraries and accessing relevant materials online according to the tasks assigned by teachers before class. Each group helps each other and cooperates with each other. Team leader is responsible for reasonable supervision and assistance of team members in learning, coordination of complementary strengths and weaknesses of team members. Meanwhile, the team leader collects the problems that the group meets in the learning process and gives feedback to the teacher.

In class, firstly, Teachers issue summary questions on the platform of nursing assistants. Students complete questions in 10 to 20 minutes. Teachers master learning problems of students through background data. Secondly, Teachers in the classroom check the situation of pre-class preparation in the form of case analysis. Students of each group demonstrated their comprehensive nursing skills according to their own achievements. Meanwhile, this group exchange and learn with other groups. Thirdly, Teachers make summary Comments and solve the problems in the process of students' achievement display and learning, and supplement the knowledge points that students have missed. With the help of teachers, students improve their knowledge structure and master knowledge systematically.

In the after-school stage, teachers issue promotional questions on the platform of nursing assistants. Through the management system of Superstar Yale background, the learning behavior of students and the data of the answer situation are analyzed and analyzed, and then the classroom performance of students is comprehensively scored. Students can review by watching teaching videos over and over again and complete the internalization of knowledge. Finally, according to the teacher's score, students make a reflection and summary.

At the end of the semester, the students in the control group and students in the experimental group were assessed for their scientific and technological abilities by using OSCE. (Figure 1)

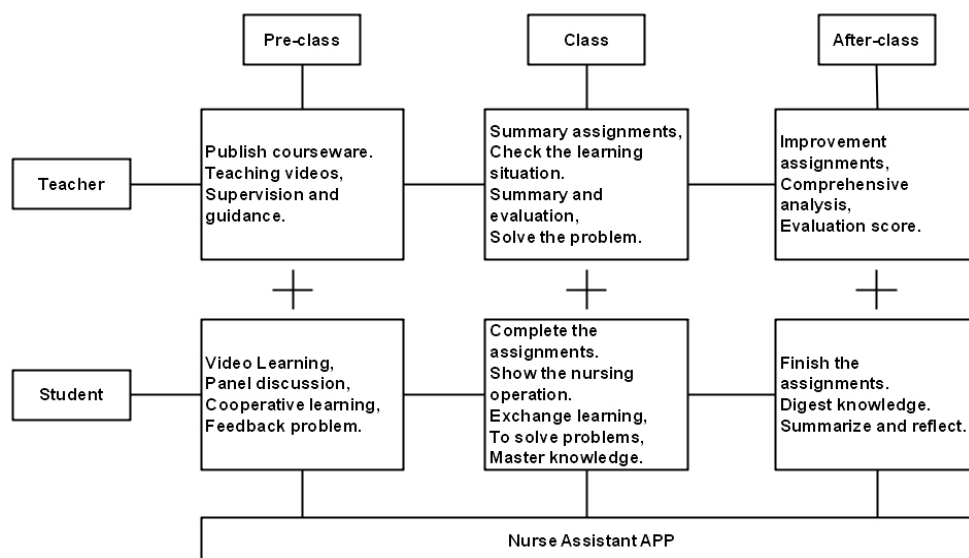


Figure 1: The classroom model flow of the flipping Classroom Combined with Nursing Assistant

2.3. Instrument

In this study, the following tools are used for research.

Objective Structured Clinical Examination(OSCE) is a method to test the clinical competence of medical students by simulating clinical scenarios. At the same time, it is also a method of assessing clinical competence which emphasizes knowledge, skills and attitudes. The content of this assessment method is very specific. It can fully display the real level of students in the process of knowledge learning, and is very suitable for the assessment of nursing education.^[28] The objective structured clinical examination includes Contents of five sites: medical history collection(20 points), operation skills(20 points), medical record writing(20 points), condition observation(20 points) and health education(20 points). A total of 100 points.

The curriculum satisfaction questionnaire contains seven items. Students rated their satisfaction from 1 (never) to 5 (always). The scoring items are as follows:

1. *Stimulate interest in learning*
2. *Favorable for the accumulation and consolidation of knowledge*
3. *Improve the ability of analysis in practical work*
4. *Improve the ability to deal with clinical problems*
5. *Improve communication skills with patients and family members*
6. *Attention is increased in class*
7. *Hope that future learning will be carried out in this way.*

2.4. Data Analysis

Data was analyzed using the SPSS 25.0. Descriptive statistics (mean, standard deviation, percentage and scope) and inferential statistics (independent t-test, paired t-test, chi-squared test) were used to analyze demographic variables. The significance level was set as $p < 0.05$.

2.5. Research Ethics

Students signed informed consent to participate in the study, volunteered to participate in and complete anonymous questionnaires. According to the Northern Nurses' Federation (2003), the ethical guidelines for nursing research were followed.

3. Results

3.1. Achievements of OSCE

The number of eligible students was 96 and no one was excluded from the beginning to the end of the experiment. According to Table 1, the scores of medical history collection in the experimental and control groups were reported as 14.31 ± 1.15 and 16.29 ± 0.94 . The scores of operation skills in the experimental and control groups were reported as 13.54 ± 1.13 and 15.75 ± 0.98 . The scores of medical record writing in the experimental and control groups were reported as 13.79 ± 1.18 and 16.42 ± 1.11 . The scores of condition observation in the experimental and control groups were reported as 13.79 ± 1.15 and 16.47 ± 0.77 . The scores of health education were reported as 15.10 ± 1.04 and 17.00 ± 0.83 , respectively. And the scores of five scores of OSCE Examination was significantly higher in the experimental group compared to that in the control groups.

Table 1: Comparing each score of OSCE between the experimental group and the control group.

group	control group(n=48)		experimental group(n=48)		t-test result		
	mean	SD	mean	SD	t	df	p

medical history collection	14.31	1.15	16.29	0.94	9.21	90.53	0.001
operation skills	13.54	1.13	15.75	0.98	10.24	92.13	0.001
medical record writing	13.79	1.18	16.42	1.11	11.21	93.58	0.001
condition observation	13.79	1.15	16.47	0.77	13.46	82.27	0.001
health education	15.10	1.04	17.00	0.83	9.92	89.50	0.001
all points	70.54	3.29	81.54	2.56	8.92	88.56	0.001

3.2. Survey of Course Satisfaction

Every score of Course Satisfaction Evaluation Table was higher in the experimental group compared to that in the control group. ($p < 0.001$) The detailed results are shown in Table 2.

Table 2: Comparing the scores of course satisfaction between the experimental group and the control group.

Projects	control group(n=48)		experimental group(n=48)		t-test result		
	mean	SD	mean	SD	t	df	p
Stimulate interest in learning	2.17	0.60	3.50	0.55	11.44	93.30	0.001
Favorable for the accumulation and consolidation of knowledge	2.10	0.71	3.19	0.45	8.60	76.42	0.001
Improve the ability of analysis in practical work	1.81	0.53	3.08	0.40	13.18	87.65	0.001
Improve the ability to deal with clinical problems	1.75	0.56	3.02	0.48	11.84	91.80	0.001
Improve communication skills with patients and family members	1.81	0.53	3.10	0.59	11.24	92.95	0.001
Attention is increased in class	1.88	0.53	2.96	0.54	9.87	93.94	0.001
Hope that future learning will be carried out in this way.	2.02	0.53	3.15	0.50	10.97	93.85	0.001

4. Discussion

The students who participated in the experiment all came from the same grade and class type, and the two groups homogeneous. In this study, we found that the scores of OSCE and course satisfaction have significantly difference in both groups, and the scores in the experimental group were significantly higher than those in the control group. Obviously, the result indicate that the diversified teaching method of flipping Classroom combined with Nursing Assistant have contributed to improve the teaching status of nursing students.

In the OSCE examination, the mean all scores of the experimental and control groups were reported as 70.54 ± 3.29 and 81.54 ± 2.26 , respectively. The data have statistic difference. ($p < 0.001$) Moreover, in the control group, four projects were under the 15 scores. (medical history collection: 14.31 ± 1.15 , $p < 0.001$; operation skills: 13.54 ± 1.13 , $p < 0.001$; medical record writing: 13.79 ± 1.18 , $p < 0.001$; condition observation: 13.79 ± 1.15 , $p < 0.001$) And the scores of the rest, health education, which only were 15.10 ± 1.04 . ($p < 0.001$) This phenomenon may be due to the lower requirement of health education for practical ability. Compared with the control group, the OSCE score of the experimental group increased significantly. (medical history collection: 16.29 ± 0.94 , $p < 0.001$; operation skills: 15.75 ± 0.98 , $p < 0.001$; medical record writing: 16.42 ± 1.11 , $p < 0.001$; condition observation: 16.47 ± 0.77 , $p < 0.001$; health education: 17.00 ± 0.83 , $p < 0.001$) The result indicate that the flipping classroom combined with Nursing Assistant has positively impacted on knowledge acquisition of students and improvement of practical ability.

According to survey of course satisfaction, all the scores of the course satisfaction questionnaire in control group were significantly lower than those of the students in the experimental group. Moreover, the evaluation of practical ability is less than 3 points in control group. (Improve the ability of analysis in practical work: 1.81 ± 0.53 , $p < 0.001$; Improve the ability to deal with clinical problems: 1.75 ± 0.56 , $p < 0.001$; Improve communication skills with patients and family members: 1.81 ± 0.53 , $p < 0.001$) However, the evaluation of practical ability is higher than 3 points in experimental group. (Improve the ability of analysis in practical work: 3.08 ± 0.40 , $p < 0.001$; Improve the ability to deal with clinical problems: 3.02 ± 0.48 , $p < 0.001$; Improve communication skills with patients and family members: 3.10 ± 0.59 , $p < 0.001$) Practical ability is an indispensable part in nursing education. The application of knowledge to practice is an interesting and pleasant learning experience, which helps students improve their practical ability and apply nursing content to the actual patient situation.^[31]

The flipping classroom adopts the student-centered teaching model to help students put knowledge into practice. By providing flipped classes, students will not only simply accumulate knowledge, but also learn how to learn, apply knowledge and acquire ability.^[29] Meanwhile, nursing assistant for assistant teaching can improve the learning flexibility of students, reduce content delivery time and increase increasing the opportunities of student team cooperation.^[30] Compared with traditional teaching, the diversified teaching method of flipping classroom combined with Nursing Assistant can help students apply theoretical knowledge to the actual environment, help teachers effectively display nursing skills, and avoid discussion obstacles caused by large classrooms and large numbers of students.^[31]

5. Limitation

This study is based on the characteristics of students. However, it still has some limitations. Firstly, only nursing students of one hospitals were recruited in the study. Further research on larger sample size should be carried out in the future. Secondly, the study lasted only one semester and lasted a relatively short time. Therefore, future research should last longer.

6. Conclusion

The purpose of this study is to explore the influence of the diversified teaching method of flipping Classroom combined with Nurse Assistant on the education of nurses. The results showed that both OSCE test scores and classroom satisfaction scores of the experimental group were better than those of the control group. Of course, we still need further experiments in order to maximize the advantages of flipping classes. We hope that this study will bring new vision and ways to the reform of nursing education.

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