ATLANTIS PRESS

Advances in Social Science, Education and Humanities Research, volume 310

3rd International Conference on Culture, Education and Economic Development of Modern Society (ICCESE 2019)

Study on the Impact of Flipped Classroom on Learning Initiative in Intensive Care Courses in Higher Vocational Nursing Students*

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***Abstract*—The aim is to evaluate the impact of the flip-up classroom on the initiative and academic achievement of the vocational nursing students. The method of survey is convenient sampling method. A total of 137 high-level nursing students from 4 classes in a higher vocational college were randomly divided into a flipped classroom (test group) and a traditional lecture class (control group). After the intervention, the two groups of nursing students' learning initiative and academic achievement were compared and use the questionnaire survey method and interview method to understand the nursing students' cognition and evaluation of the curriculum flipped classroom. The results show that 60.6% of the students accepted the way of flipped classroom learning. The most worrying was the learning effect and self-time management. The learning group's learning attribution, learning maintenance and academic performance were higher than the traditional lectures, and the difference was statistically significant (P<0.05). It can be concluded that the flipped classroom based on micro-video resources can improve the learning initiative and academic achievement of nursing students to a certain extent. The self-time management ability of nursing students is an important factor to ensure the implementation of the classroom.**

Keywords—nursing students; flipped classroom; emergency and critical care; studying initiative

I. INTRODUCTION

In recent years, informatization and networking have greatly promoted the reform of education and teaching. The curriculum construction of network forms such as "Mooc", "Micro-course" and "Course Resource Library" has been developing increasingly. In the process of using online course resources, flipped class has become an important teaching method. The nursing major in higher vocational education schools not only emphasizes the theory of the curriculum, but also pays attention to the practical practice of technology. In the actual teaching, it emphasizes the autonomy and exploration of students. The flipped classroom is completely in line with this teaching concept. At the same time, it can also provide operational solutions and processes for the realization of this concept, and has a good application prospect in university teaching [1]. This study takes some of the chapters in the acute and serious nursing course as an example to explore the application effect of the flipped classroom in the first aid course for teaching reference.

*Fund: 1. Project on Ningbo Education Planning Project (YGH-2015YGH120); 2. Medical Education Research Project of the Chinese Medical Association Medical Education Branch (2016A-HL009)

II. OBJECTS AND METHODS

A. Objects

The convenience cluster sampling method was adopted, and the principle of informed consent was adopted. Four classes of nursing students were selected in the institution where the researcher was located, and a total of 137 nursing students were selected as research objects. The age of the objects is about 20.5 ±0.87 years old, minimum 19 years old, maximum 23 years old with 1 male student and 136 female students; 18 of them are from the city and119 are from the countryside. 38 are the only children in their family, 99 are the non-only children and all of them are nursing students. The four classes were randomly divided into two groups (one group divided into two classes) by the lottery method, which were respectively the traditional lecture class (referred to as "traditional class") as the control group (n=71), and the other

group was the flipped classroom class (referred to as "flipped class") as a test group (n=66). The two groups were taught by the same teacher. There were no significant differences between the two groups in terms of age, gender, place of origin, scores of subjects, cognition of flipped classrooms ($p>0.05$).

B. Methods

1) Teaching methods: The same teaching resources are used in the two groups. The textbooks are selected in the second edition of the "Emergency Care" by the People's Military Surgeon Publishing House. The selection of the course content is evaluated by 6 teachers in the course group to determine the the three parts of "accidental injury rescue", "acute poisoning rescue" and "organophosphorus pesticide poisoning rescue" with low difficulty coefficient.should be used as the pilot content of the course. Each content concludes 2 credit hours, 45 minutes per class with 6 credit hours in total, and the teaching resources and curriculum implementation of the two groups of nursing students.(See "Table I" for details) The flipped class and the traditional class are assigned as "sandwich" in the course of class implementation, that is, "5 mins self-learning examination + 35 mins course + 5 mins class summary", the two groups are consistent in the arrangement of the two "5 mins". The difference is that in the "35 mins course study", the traditional class is conducted in the manner of teacher-led teaching, that is, the class is mainly conducted by the teacher-teaching and the students passively listening to the class. The flipped class adopts the group discussion and problem focusing under the guidance of the teacher. The specific implementation plan is:

- Problem guiding: the teacher will throw the main content of the learning in the form of questions.
- Group discussion: the students focus on the main problems and use the content learned before the class to make a discussion to find solutions to the problem and answer.
- Problems focused: synthesize the results of the various groups, teachers to comment, and give advice on incomplete and unreasonable answers, students brainstorm, and finally form the best answer.

Through the above steps, the classroom has turned into a student-led, teacher-assisted teaching method. The teaching resources provided by the two groups are shown in "Table I".

TABLE I. IMPLEMENTATION PROCESS OF FLIPPING CLASSROOM CLASSES AND TRADITIONAL LECTURE CLASSES

Project	Course content	Sharing teaching resources	Flipped classroom	Traditional lecture class
1	Emergency treatment of accidental injury	Teaching material Exercise book	Before class: "micro video + existing teaching resources" self-learning	Before class: "micro video + existing teaching resources" self-learning
2	Acute poisoning rescue	PPT courseware	In class: teacher guidance + student discussion	In class: lecture + question
3	Emergency treatment of organophosphorus pesticide poisoning	Online course online resources	After class: Exercise + Discussion + Stage Test	After class: Exercise + Discussion + Stage Test
Differences	No	No	Adding micro video before flipping classes, and teaching different ways in class	

2) Evaluation method of classroom effect: After the course, at the same time, the knowledge test and questionnaire survey of the above teaching contents will be conducted for the two groups of nursing students at the same time.

- Stage knowledge test: according to the course content, the other professional teachers of the course group give the proposition according to the school assessment scoring standard, including three parts of accidental injury rescue, acute poisoning rescue and organophosphorus pesticide poisoning rescue, totally 100 points.
- Self-assessment scale for college students' learning: the scale compiled by Ying Jia [2] includes five dimensions: learning attribution, learning sense, learning maintenance, learning adjustment and learning efficiency. The scale of the questionnaire is the Likert 5-point scale method, from "completely consistent" to "Complete non-conformity" is recorded as 5 points, 4 points, 3 points, 2 points, and 1 point. The higher the score of the questionnaire is, the stronger the learning initiative can be, the stronger the willingness to learn actively is, and the lower the score indicates the active learning. The less willing does not mean the less initiative. The Cronbachα and split-half reliability of the questionnaire subscale are between 0.6 and 0.8, and the reliability of the total scale is above 0.8; the content validity and structural validity are good.
- "Emergency Care" course flipped classroom questionnaire and interview outline: including self-learning effect check method, factors affecting self-learning, flipped classroom implementation evaluation and so on.

3) Statistical methods: All data were input into SPSS13.0 software for statistical analysis. Descriptive analysis and two-sample t-test were used for analysis, with $\alpha=0.05$ as the test level.

III. RESULTS

A. Analysis of Cognition of "Flipped Classroom"

Before the implementation of the flipping class, the cognition survey was conducted on the two groups. As a

result, the traditional lecture class and the flipped class had no statistically significant difference between the two groups ($p>0.05$). The overall cognition is shown in "Table II".

TABLE II. ANALYSIS OF THE COGNITION OF THE "FLIPPED CLASSROOM" OF VOCATIONAL NURSING STUDENTS

Variable	Classification		Composition ratio
Think flipping classroom is better than traditional classroom	Yes	103	75.2%
	No	34	24.8%
Which way prefer to teach in	Traditional teaching	54	39.4%
	Flipped Class	83	60.6%
The most inconvenient to implement a flipped classroom	Inconvenient to watch video materials	11	8.0%
	Not used to this self-learning method	37	27.0%
	Worried about the effect of self-learning	43	31.4%
	Can't manage self-learning time	44	32.1%
	Others	2	1.5%
Flipped classroom video material learning equipment	Smart phone	34	24.8%
	Desktop computer	75	54.7%
	Ipad	10	7.3%
	School computer room	17	12.4%
	Other equipments	1	0.7
Self-learning ability evaluation	Strong	11	8.0%
	General	112	81.8
	Weak	14	10.2%
Self-learning effect check before class	Random check	114	83.2%
	Group system, designating classmates	23	16.8%
	Everyone answering together	24	17.5%
	Other methods	0	0
The most important factors affecting pre-class learning	Too many content and no time to learn	64	46.7%
	More online after school, ignoring learning	19	13.9%
	Self-control being not strong	53	38.7%
	Other reasons	1	0.7%

B. Comparison of the Learning Motivation and Stage Test Results of the Two Groups of Nursing Students

At the end of the course, the two groups of nursing students were asked to conduct a proactive questionnaire survey and a phase knowledge test. Two-sample t-test showed that the flipped class was higher than the traditional class in learning attribution, learning maintenance and test scores, and the difference was statistically significant ($p<0.05$), as shown in "Table III".

TABLE III. COMPARATIVE ANALYSIS OF THE TWO GROUPS OF NURSING STUDENTS IN LEARNING INITIATIVE AND PERFORMANCE

Variable	Learning initiative						Grades
	Learning attribution	***Learning meaning***	***Learning maintainance***	***Learning adjustment***	***Learning efficiency***	***Learning initiative***	
Traditional lecture class	3.45±0.56	4.12±0.74	2.78±0.32	2.92±0.49	2.77±0.57	3.13±0.34	76.61±7.19
Flipped classroom	3.66±0.59	3.99±0.69	2.92±0.35	3.12±0.68	2.93±0.66	3.25±0.40	83.09±6.76
t	-2.141	1.388	-2.520	-1.950	-1.559	-1.936	-5.429
p	0.034	0.168	0.013	0.054	0.121	0.055	0.000

IV. DISCUSSION

A. The Uncertainty of Self-time Management and Self-learning Effect Is an Important Factor Affecting the Implementation of Flipped Classroom

The flipped classroom is a new teaching model in the informationization environment, which the curriculum teachers provide learning resources with teaching videos as the main form, students complete the viewing and learning of teaching resources such as teaching videos before class and teachers and students complete activities homework assignments, collaborative exploration and interactive communication in class [3]. "Table II" shows that 75.2% of nursing students think that flipped classrooms are better than traditional lectures, and 60.6% of nursing students tend to implement flipped classrooms But in the implementation what need to be particularly worried about are the two aspects of "self-administered learning time" and "learning effect". 81.8% of nursing students believe that their ability to learn independently is average. Interview students' evaluation of "flip classroom", two opposing views: Most supported nursing students believe that flipped classrooms can:

- Give full play to learning autonomy and make students have more room for thinking.
- Improve self-learning ability and help mobilize enthusiasm.
- Save time and be clearer of the emphasized points and difficult points.
- Be interesting.

This is consistent with the research results of Yang Xiaoling [4]; But a few nursing students holding the anti-views think that:

- They are accustomed to traditional teaching and not willing to change.
- Their self-learning ability is not strong enough.
- The teacher speaks more carefully, and they will understand incompletely.

Two of the students mentioned that the study time is tense, the learning pressure is too great, and there is not so much time to study independently. It can be seen that although flipped classroom allows students to control all aspects of learning relative to "freedom" and most nursing students can accept it, there are also contradictions about self-time management and self-control.

B. Implementing the Flipped Classroom Can Improve the Motivation of Nursing Students to a Certain Extent

Some studies have pointed out that medical education at home and abroad faces challenges such as "the students' self-learning ability is not strong, and the curriculum is teacher-led" [5]. In terms of autonomous learning, Table 3 of this study shows that the flipped class is more about learning attribution (mainly for the need of knowledge and skills, self-fulfillment) and learning maintenance (mainly by using external conditions to promote learning behavior and overcoming the impact). The level of behavior of the internal factors of learning needs to be high. The characteristics of the flipped classroom require students to complete the learning resources before class. This encourages the nursing students in the flipping class to complete the classroom learning in advance. Therefore, the demand for self-knowledge skills and the use of conditional learning are significantly higher than the lecture class. The stage test results show that the performance of flipping class nursing students is better than traditional teaching. The above two points reflect the advantages of flipped classroom. But other dimensions of learning initiative, such as learning sense (mainly learning value), learning adjustment (mainly sensitivity and predictability of learning behavior and attitude), learning efficiency (mainly learning efficiency, time utilization) There is no difference between the class and the flipping class. The interview further learned that the active learning of the flipping class is mainly based on the task given by the teacher, focusing on "forced learning", and has not internalized into the inner desire for knowledge and skills. There is no difference in the above three aspects. This suggests that short-term flipped classroom teaching has improved in some aspects of learning initiative, but it still needs to be explored in depth to truly drive the internal motivation of students' self-learning.

C. The Flipped Classroom Based on Micro Video Resources Can Adjust the Enthusiasm of Nursing Students and Improve the Self-learning Effect

The "flipped classroom" model requires the support of a powerful online platform [5]. This study relies on the "Zhejiang Boutique Online Open Course Platform", and the two groups of nursing students have been provided with the same learning resources before class. In the interview, most students think that the quality of learning is the most concerned aspect of the students. It is recommended that teachers use random check method to test the effect of students' independent learning. In the self-learning before class, recorded micro-videos based on the emphasized points and difficult points of the course plays an important role and a leading role in independent learning. Chen Yingying [6] also pointed out in the teaching of nursing students also teaching that micro-teaching can improve the ability and efficiency of self-learning for nursing students. Shao Mingjie [7] also pointed out in the research that at present, it is generally believed that the effective resources for flipped classroom pre-school learning are video resources. Video stimulates learners' multiple senses while making complex knowledge more visual and intuitive, and this will promote learning and understanding of knowledge which can better stimulate the learner's interest in learning; some researchers also use micro-video as one of the technical elements of the implementation of flipped classroom [8]. In summary, the three parts selected in this study implement the flipped classroom can better mobilize learning initiative and improve academic performance than the traditional teaching method.

V. CONCLUSION

In summary, the implementation of the flipping classroom has a positive effect on the improvement of student initiative and academic achievement in the acute and serious care "accidental injury, acute poisoning, and emergency treatment of organophosphorus pesticide poisoning". Most students also tend to accept this kind of teaching way. However, this study only draws four classes in one school. The research subjects are limited. Whether the research results can be extended to other contents of the course and other courses still need to be further explored.

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