

Research on the Influence of Team Cooperation Flipped Classroom on the Problem-Solving Ability, Achievement Motivation and Coping Style of Undergraduate Nursing Students

Juan Xiao, Yan Li^{a,*}, Lanlan Xu, Yixue Luo, Lingxuan Tao

Hubei University of Medicine, Shiyan, Hubei, China

^aLainy24@126.com

*Corresponding author

Keywords: Flipped Classroom, Undergraduate Nursing Students, Problem-Solving Ability, Achievement Motivation, Simple Coping Style

Abstract: To study the influence of team cooperation flipped classroom on the problem-solving ability, achievement motivation and coping style of college nursing students, cluster sampling method was used to select 2018 and 2017 undergraduate nursing classes as the experimental group and the control group. 269 nursing students in the experimental group adopted the team cooperation learning mode in the flipped classroom, 253 nursing students in the control group adopted the personal centered flipped classroom model. The problem-solving ability scale, achievement motivation scale and simple coping style scale were used to evaluate the two groups of nursing students after the class. The nursing students in experimental group problem-solving ability, achievement motivation was significantly higher than that of control group ($P < 0.05$), and tends to adopt a positive coping style. The application of team cooperation flipped classroom can improve the problem-solving ability, achievement motivation and positive coping style of undergraduate nursing students, and accords with the strategic requirement of education informatization to promote the development of education modernization and which worth popularizing.

1. Introduction

Problem-solving ability refers to the ability of an individual to identify problems, formulate goals, choose methods, implement strategies and test the effects by using problem-solving procedures, and it is an important component of nursing students' nursing soft-plan ability [1,2]. Achievement motivation refers to the internal motivation and psychological tendency to strive for excellence in order to achieve higher goals, which will affect the direction and degree of one's efforts, and is the key factor to determine one's career success [3]. The research shows that the level of individual achievement motivation is closely related to their career adaptability, and a high level of achievement motivation can encourage college students to strive for success and achieve their goals [4,5]. Coping style is an individual's constant cognitive and behavioral efforts to the environment or internal needs and their impacts [6]. The research shows that [7,8] coping style affects the learning burnout of nursing students and the job burnout of nurses. Education is the first stage to help nursing students acquire nursing knowledge, improve nursing skills and cultivate clinical thinking [9]. It is of great significance to improve the problem-solving ability, achievement motivation and coping style of nursing students to cultivate their clinical thinking.

The Outline of the National Medium-and Long-Term Education Reform and Development Plan (2010-2020) [10] points out that it is the only way for education reform and development to lead education modernization with education informatization, and flipping the classroom is undoubtedly an important practice path for education informatization in recent years. It is the inherent requirement of flipping the classroom to form a student-centered teaching mode that focuses on the cultivation of students' critical thinking ability through inquiry-based and active learning, with the help of the network platform to realize the expansion from inside to outside class [11]. In the basic nursing course of our school, we have carried out the team cooperation learning flip class, and

achieved good results. It has been rated as the first national online and offline mixed first-class course ^[12]. The related contents are reported as follows.

2. Objects and Methods

2.1. Participants

The nursing undergraduate classes of grade 2018 and grade 2017 in our school were selected as the experimental group and the control group by convenient sampling method. There were 269 nursing students in the experimental group, including 235 girls and 34 boys, aged 18.85(1.22) years. There were 253 nursing students in the control group, including 220 girls and 33 boys, aged 19.03(0.67) years. Informed consent was obtained from all students participating in the study. There is no significant difference in gender, age, basic courses of early study between the two groups of nursing students ($P>0.05$).

2.2. Teaching Method

The teachers, teaching hours and teaching places of the experimental group and the control group are the same.

2.2.1. Registered Account

After the course begins, the nursing students registered their mooc account online. In order to master the learning progress, the teacher will send the learning schedule to the students in advance.

2.2.2. Group

The control group divided each class into three groups, each with 24-30 nurses, and carried out a personal-centered flip classroom. The experimental group divided each class into three groups, each of which was divided into 8 groups, with 3-4 nurses in each group, using teamwork learning in the flip classroom.

2.2.3. Teaching Method

2.2.3.1. Students' Lectures

Set up 2 report topics for each class. The experimental group asked nursing students to collect and sort out data and make PPT in groups, and then report in class. Each group took turns to participate. Nursing students in the control group signed up independently.

2.2.3.2. Teacher's Explanation

Teachers connect the key knowledge with cases, news, TV plots or real people's stories as indexes, and explain them appropriately to help students better understand, master and apply knowledge. In addition, teachers will extract and analyze the high-frequency problems of nursing students in the pre-class learning process, and explain them as the key content of classroom teaching, so that nursing students can better grasp the key points and thoroughly understand the difficulties. The two groups of nursing students have the same teaching methods in this part.

2.2.3.3. Case Analysis

Set up 4 case studies for each class. The experimental group requires nursing students to work in small groups, with high cooperation within the group, discussing cases, exchanging ideas, unifying understanding, and summarizing the discussion results. Teachers randomly selected 2 groups to share the gains of group discussion. The nursing students in the control group thought about the case alone, and the teacher randomly named two nursing students to share their personal opinions.

2.2.3.4. Classroom Detection

Exercises related to classroom content are prepared in advance by teachers, and are conducted 5 minutes before the beginning and end of the flipped class to test the knowledge of nursing students.

This content is completed through "Learning Pass APP". Two groups have the same teaching methods in this part.

2.2.3.5. Homework

After class, the assignment is Posted by the teacher through the "Learning Pass APP". The form is mainly case analysis, and the experimental group is completed in groups. The team members are required to fully discuss and sort out the answers. Each nursing student was required to complete it alone in the control group

2.3. Evaluating Indicator

After the course, the teaching quality was evaluated by the scale of problem-solving ability, achievement motivation and simple coping style. ① Problem-solving ability scale is used to evaluate individual problem-solving ability and shortcomings. It was compiled by Andrew, translated into Chinese by Wang Wei ^[13] and tested for reliability and validity. Including five dimensions (25 entries): positive problem orientation, rational problem solving, negative problem orientation, impulsive/negligent style and avoidance style. Using the 5-level scoring method, each item is assigned 1 to 5 points from "not conforming to me at all" to "conforming to me very much". The first two dimensions are used to evaluate problem-solving ability, and the higher the score, the stronger the problem-solving ability. The last three dimensions are used to evaluate the defects or deficiencies in problem solving. Cronbach's α coefficient of the subscale is 0.89, 0.86, 0.88, 0.71 and 0.91 respectively, and Cronbach's α coefficient of the total scale is 0.87. ② Achievement Motivation Scale This scale was translated by Gjesme and Nygard in Norwegian psychology in 1970 and by Ye Renmin and Hagtvet ^[14] in 1992. Includes two dimensions (30 entries): Pursuing Success (Ms) and Avoiding Failure (MAF). Using the 5-level scoring method, each item is assigned a score of 1 to 5 points from "very inconsistent with me" to "very consistent with me". The total score of motivation is obtained by subtracting the score of motivation to avoid failure from the score of motivation to pursue success. The higher the score, the stronger the motivation to achieve. This scale has good reliability and validity, and Cronbach's α coefficient is 0.894. ③ The Simple Coping Style Questionnaire, which was compiled by Jie Yaning et al. ^[15] in 1998, was used to test the characteristics of individual coping styles to cope with stimuli. Including two dimensions: positive coping and negative coping (20 entries). All items are graded by four levels, and each item is assigned 0 to 3 points from "don't take" to "often take". The higher the positive coping score, the more inclined to adopt positive coping style, and the higher the negative coping score, the more inclined to adopt negative coping style. The total Cronbach's α coefficient of the scale is 0.90.

2.4. Statistical Methods

The analysis of the data was performed using the Statistical Package for Social Sciences (SPSS) Version 23 software package. A p value of <0.05 was accepted as statistically significant in the analysis of all tests. Measurement data were described as mean \pm standard deviation, T test was used for comparison between groups.

3. Results

3.1. Problem-Solving Capabilities

The problem solving ability of nursing students in the experimental group was higher than that in the control group, and the difference was statistically significant ($P < 0.05$, Table 1).

Table 1 Comparison of problem-solving capabilities of the two groups(x ±s).

Group	Number	Positive problem orientation	Rational problem solving	Negative problem orientation	Impulsive/negligent style	Avoidance style
Experimental	267	17.50±2.33	12.20±3.80	14.83±2.42	11.07±2.13	18.90±2.86
Control	248	16.96±2.66	11.47±3.30	15.92±2.51	11.51±2.29	19.29±3.06
T		2.459	2.329	-5.036	-2.280	-1.495
P		0.014	0.020	0.000	0.023	0.136

3.2. Achievement Motivation

The nursing achievement motivation of the experimental group was higher than that of the control group, and the difference was statistically significant ($P < 0.05$, Table 2).

Table 2 Comparison of achievement motivation of the two groups(x ±s).

Group	Number	Pursue success	avert failure	Total score
Experimental	267	51.86±5.17	47.68±5.12	4.18±6.04
Control	248	50.54±6.66	48.63±5.21	1.91±8.22
T		2.525	-2.105	3.593
P		0.012	0.036	0.000

3.3. The Simple Coping Style

The level of positive coping style in the experimental group was higher than that in the control group, and the level of negative coping style was lower than that in the control group, with statistical significance ($P < 0.05$, Table 3).

Table 3 Comparison of coping styles of the two groups(x ±s)

Group	Number	Positive coping style	Negative coping style
Experimental	267	2.06±0.43	1.26±0.55
Control	248	1.97±0.42	1.40±0.60
T		2.437	-2.764
P		0.015	0.006

4. Discussion

4.1. Team Cooperation Flipped Classroom Improves the Problem-Solving Ability of Undergraduate Nursing Students

The research shows that the positive problem orientation score is the highest and the rational problem solving score is the lowest in the two dimensions of evaluation ability; Among the three dimensions of evaluating defects or deficiencies, avoidance style scored the highest, while impulsive negligence style scored slightly lower. It shows that nursing students have certain problem-solving ability, but they are not active in solving problems, and they are easy to feel pessimistic when they encounter problems that cannot be solved, lacking rational thinking and systematic problem-solving methods. This is basically consistent with the research of Ma Xiang^[16,17] and others. The problem-solving ability of nursing students in the experimental group is higher than that in the control group. The reasons are as follows: ① Teamwork to flip the classroom improves the autonomous learning ability of nursing students. Under this teaching mode, nursing students have a strong sense of participation. If nursing students want to perform well in the team, they need to do their homework in advance, take the initiative to study, actively consult the literature, collect relevant information and think positively. Because of full preparation, every nursing student wants to show himself in the team and actively participate, and the discussion among group members becomes more intense. In the process of team members discussing and

collecting information, the autonomous learning ability of nursing students has also been improved. The study found that ^[18], the better the self-learning ability of nursing students, the stronger the problem-solving ability. ② Teamwork to flip the classroom improves the thinking ability of nursing students. The process of solving problems is the process of students applying their thinking and reasoning ability^[13]. In this teaching mode, if nursing students want to solve problems and complete tasks, they need rational thinking and logical thinking to analyze and identify the problems, and then solve the problems in a planned and targeted way. Nursing students use library materials, network resources and related learning materials to solve their doubts, and their thinking ability has been improved to some extent when formulating problem-solving schemes. Compared with the control group, nursing students in the experimental group have different opinions and ideas in the process of analyzing information, judging information and finding arguments to solve problems, which ignite the spark of knowledge, stimulate the imagination of nursing students, promote the orderly development of nursing students' thinking and improve their thinking ability. At the same time, teachers will guide nursing students to participate actively in various ways, discuss and analyze the problems from multiple angles and in depth, broaden the thinking of nursing students to analyze and solve problems, and finally improve their problem-solving ability. This study found that there was no difference in the scores of avoidance style between the experimental group and the control group, which may be related to the influence of Chinese traditional thought since childhood, that is, adhering to the concept that everything is more important in conflict negotiation, which led China people to adopt avoidance, compromise and tolerance rather than using conflict management strategies to deal with problems ^[19].

4.2. Team Cooperation Flipped Classroom Improves Achievement Motivation of Undergraduate Nursing Students

The research shows that the achievement motivation of this group of nursing students is at a medium level, which is basically consistent with the research results of Niu Xinli ^[5]. The motivation of nursing in the experimental group was higher than that in the control group. The reasons are as follows: ① Teamwork to flip the classroom has stimulated the curiosity of nursing students. This teaching mode is novel, interesting and attractive. Teachers will answer questions about nursing students' learning problems before class on the Internet, and at the same time, teachers will also use various ways to stimulate nursing students' interest in learning, such as group discussion and role-playing, so that nursing students can concentrate more on their personal tasks before class. Through the performance in the group task, the nursing students can understand their mastery of knowledge, and at the same time, they can see their own shortcomings, thus stimulating the fighting spirit of the nursing students, making them realize that they should work hard in the early stage to stand out in the group task, and further stimulating their desire to explore. In the classroom, teachers' comments on the completion of each group's tasks make the nursing students in a state of psychological disharmony and have a stronger thirst for knowledge. Nursing students turn their thirst for knowledge into a driving force for success, thus improving their achievement motivation. ② Teamwork flips the classroom so that nursing students can get more successful experiences. This teaching mode puts students in the main position of learning by issuing learning tasks in advance, so that students can clearly understand what they want to learn and the degree they want to master, and then take part in learning activities by themselves, using their brains around the goal. When nursing students complete a certain task, they will feel a sense of accomplishment, joy and impact, which will enhance their self-confidence and improve their chances of success. At the same time, a person's ability is limited, and team cooperation flips the classroom to form a learning community by integrating individual abilities and resources, which changes the situation that only excellent students can get successful experience in the past, makes most nursing students have the possibility of success in the classroom, and helps nursing students experience success in a wider range. Research shows that ^[20] the more successful people have, the higher the level of achievement motivation. Finally, the achievement motivation of nursing students was improved. Rational solution strategy to deal with problems.:

4.3. Team Cooperation Flipped Classroom Improves the Positive Coping Level of Undergraduate Nursing Students

The research shows that the overall coping level of nursing students in this group is high, and they tend to adopt positive coping style when facing setbacks and pressures, which is basically consistent with the research of Fan Xing^[21,22] et al. Compared with the control group, the nursing students in the experimental group are more inclined to adopt positive coping styles and less likely to adopt negative coping styles. Teamwork flips the classroom through the tasks assigned by the teacher, so that the nursing students have a clear direction, that is, they not only need to watch videos, consult literature and complete exercises before class, but also need to discuss with team members and communicate with the teacher online. This makes the nursing students unite into a group, and they are not alone, but have a strong backing. After the previous study, the nursing students understood the knowledge points more thoroughly and mastered them more firmly, so that the nursing students themselves had a certain knowledge base. At the same time, nursing students can turn to other members of the team for help when they encounter difficulties, so they show strong self-confidence, believe that they have the ability to handle things well, can actively deal with problems, have an optimistic attitude towards problems, and will be more active in their study and life. In addition, teachers create a relaxed and pleasant learning atmosphere by setting up scene display and debate contest, so that nursing students realize that learning is a very interesting thing, not as boring as expected. Once the learning interest of nursing students is mobilized, it will change passive learning into active learning, thus investing more energy and time in learning, and the discussion between teams will become more intense and meaningful. During the discussion, the analytical and problem-solving skills and communication skills of nursing students will also be improved. When facing problems and challenges, nursing students will encourage themselves, treat their own shortcomings correctly, rationally deal with the difficulties they face, actively seek solutions to problems, and have a positive coping style^[23].

5. Discussion

Team cooperation flipped classroom pays attention to teamwork and exploration, which meets the requirements of educational modernization. This teaching mode has played the leading role of students, stimulated the learning motivation and interest of nursing students, and promoted the problem-solving ability, achievement motivation and positive coping style of nursing students to some extent. It is an effective new teaching mode. However, there are still some problems in the after-class reflection, such as the nursing students' inaccurate grasp of knowledge points, nervousness and anxiety during class reporting, which will also become a topic for our future research.

Acknowledgements

Medical Education Branch of Chinese Medical Association and Medical Education Committee of China Higher Education Association in 2020.(2020B-N02315)

References

- [1] Siu AM, Shek DT. The Chinese version of the social problem-solving inventory: some initial results on reliability and validity[J]. *J Clin Psychol*,2005,61(3):347-360.
- [2] Yan Tingting, Zhang Yinghui, Zhang Fengxia, et al. Qualitative research on the elements of nursing soft skills of higher vocational nursing students [J]. *China Journal of Practical Nursing*, 2017,33(36):2863-2865.
- [3] Si Jiwei, Wang Jinsu, Yang Dianxia, et al. The influence of teachers' work values and achievement motivation on job burnout [J]. *Journal of Shandong Normal University (Humanities and Social Sciences Edition)*, 2009,54(5):135-138.

- [4] Wu Jieqing, Dong Yongyan, Xiong Junmei, et al. The relationship between college students' active personality and career adaptability: the mediating role of achievement motivation and its gender differences [J]. *Psychological Development and Education*, 2016,32(5):547-556.
- [5] Niu Xinli, Xiao Rong, Zhang Ruixue. The mediating role of procrastination between achievement motivation and positive mental health of college students [J]. *Chinese Journal of Behavioral Medicine and Brain Science*, 2017,26(12):1106-1111.
- [6] Wang Shuyan. A Review of Subjective Well-being Measurement [J]. *Social Psychological Science*, 2004,19(5):45-48.
- [7] Pan Yunbo. Relationship between time management disposition, coping style and learning burnout of secondary vocational nursing students [J]. *Campus Psychology*, 2017,15 (6): 421-426.
- [8] Qu Libo, Wang Fenfen, Bai Xiaoyu. The relationship between nurses' psychological flexibility, coping style and job burnout [J]. *Chinese Journal of Behavioral Medicine and Brain Science*, 2019,28(2):144-148.
- [9] Li Yanyan, Liu Bingjin, Chen Cuiping, et al. Practice of task-oriented experiential teaching in improving nursing students' clinical decision-making ability [J]. *China Journal of Practical Nursing*, 2019,35 (6): 457-461.
- [10] http://www.moe.gov.cn/srcsite/A01/s7048/201007/t20100729_171904.html.
- [11] Mo Yongyi. Research on cooperative learning mode under the concept of flipping classroom teaching [J]. *Degree and Postgraduate Education*, 2016(4):18-22.
- [12] http://www.moe.gov.cn/srcsite/A08/s7056/202011/t20201130_502502.html.
- [13] Wang Wei. Research on the present situation of nursing interns' autonomous learning ability and problem-solving ability and its enlightenment [D]. Shanghai: Fudan University, 2010.
- [14] Ye renmin, hagtvvet K. measurement and analysis of achievement motivation [J]. *psychological development and education*, 1992,8(2):14-16.
- [15] Xie yaning. A preliminary study on the reliability and validity of the Simplified Coping Style Scale [J]. *China Journal of Clinical Psychology*, 1998,6(2): 53-54.
- [16] Ma Xiang. Investigation on the problem-solving ability of nursing undergraduates under PBL teaching mode [J]. *Curriculum Education Research*, 2017 (30):143-144.
- [17] Li Yan, Cheng Li. Study on the correlation between problem-solving ability of nursing students and psychological resilience [J]. *Nursing Research*, 2015,29(35): 4394-4397.
- [18] Zhang Xiaohong, Luo Ruzhen, Zhang Chunmei, et al. The relationship between problem-solving ability and self-learning readiness of nursing undergraduates: the mediating effect of academic self-efficacy [J]. *Nursing Research*, 2017,31(33):4230-4233.
- [19] Lau Y. Factor affecting the social problem-solving ability of baccalaureate nursing students [J]. *Nurse Educ Today*, 2014,34(1):121-126.
- [20] Li Aifen, Ding Shengyun. How to improve students' achievement motivation [J]. *Exam Weekly*, 2013,51:175.
- [21] Fan Xing, Li Caifu. Study on the relationship between learning adaptability and coping style of nursing undergraduates [J]. *Health Vocational Education*, 2019,37(23):106-108.
- [22] Yang Huimin, Yang Qin, Zhao Zheng. Investigation and analysis on coping style of nursing undergraduates and its influencing factors [J]. *Agricultural University Medicine*, 2018,40. (3):277-279.
- [23] Xuan Xi, Wu jie, Ma Huixia, et al. The intervention of dancing therapy on college students' self-acceptance and self-efficacy [J]. *China Journal of Clinical Psychology*, 2017,25(3):584-587.