

Application of Project-based Learning in Nursing Education

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Abstract: Recently, our society is demanding problem-solving ability as an important competency. In nursing education, the learner-centered learning environment has become important. Therefore, this study aimed to investigate the effect of creative personality by applying project-based learning to nursing students. To achieve this purpose, 34 students taking a health program development and evaluation course were tested for their creative personality. Collected data were analyzed using descriptive statistics and t-test by SPSS 23.0 program. The results are as follows: At first, after applying the project-based learning method, creative personality was significantly improved ($p<.001$). Second, looking at the correlation among the sub-factors of creative personality showed a significant positive correlation was shown by self-confidence ($r=.390, p=.011$), imagination ($r=.482, p=.001$), and humor ($r=.371, p=.015$). According to the research results, it was found that the project-based learning method is effective in improving the creative personality of nursing students. Therefore, it is suggested to apply the learner-centered learning method in nursing education to improve the creative problem-solving ability of nurses.

Keywords: *project-based learning, nursing student, creative personality*

1. Introduction

Our society demands creative thinking and problem-solving skills. These social changes also occur in the hospital environment. Instead of simply delivering nursing knowledge, the field of nursing education must also train students to gain creativity, critical thinking, communication, and collaboration. For this reason, teacher-centered education needs to be shifted to learner-centered education. In the 21st century, faced with complex and diverse problems, not only the acquisition of knowledge, but the ability to newly combine and reconstruct knowledge is important. It is the creative problem-solving ability that is essential at this time. Among the core competencies of university students, the creative problem-solving ability is suggested as a very important factor. Creative problem-solving ability is closely related to the creative personality and creative thinking process. Creative personality refers to the personality traits of a creative person and can be expressed by interest, interest, and attitude toward creativity.

The recent demand for a diversified and open society is shifting the focus of university education from the teacher-centered approach to the learner-centered innovative approach. Innovative approaches include team-based learning, problem-based learning, project-based learning, and flipped learning. Project-based learning is receiving attention because of the growing importance of learner-centered learning environment.

Project-based learning is a learning method that involves the process of solving a project besides the acquisition of knowledge and practicing specific activities to express the project outcomes in various ways. Through this learning method, learners learn on their own by questioning and discussing with other students to solve problems they organized in a real-life situation [1].

Creativity contributes not only to personal growth but also to the development of society, so it has been recognized as an important task of education for the promotion of creativity of university students. Therefore, in the 21st century, creativity or creative problem-solving ability is the core competency of university students. Creative personality can be shown by the attention to creativity,

interest, and creative attitude. In particular, creativity can be defined by the universal personality traits commonly shared by creative people [2]. Creativity education courses for undergraduates in Korea are mostly liberal arts, and previous studies report that creativity lectures affect creative attitude and exchange relationships among team members [3]. A study applying PBL to a learner-centered learning method in nursing major subject reports that creative thinking, creative motivation, and creative attitude are effective for the problem-solving ability [4]. A study applying the flipped classroom approach reports that the approach improves self-efficacy, critical thinking, and communication of undergraduate nursing students [5]. Creative problem-solving classes improve the creative ability and creative problem-solving leadership of undergraduate nursing students [6]. The action-learning approach is effective in developing and improving the creative problem-solving ability of nursing students [7], and project-based classes enhanced creative thinking, creative tendency, and problem-solving ability of undergraduates [8].

It is essential to have the ability to approach and solve problems that occur during diverse and complicated nursing practices creatively by breaking away from the norms. Nurses must be able to solve problems by interacting with their coworkers and experts in other fields. Accordingly, the purpose of this study is to examine the effect of project-based learning on the creative personality by applying project-based learning to nursing education as a means to increase teamwork competence of students for solving problems together through creative thinking.

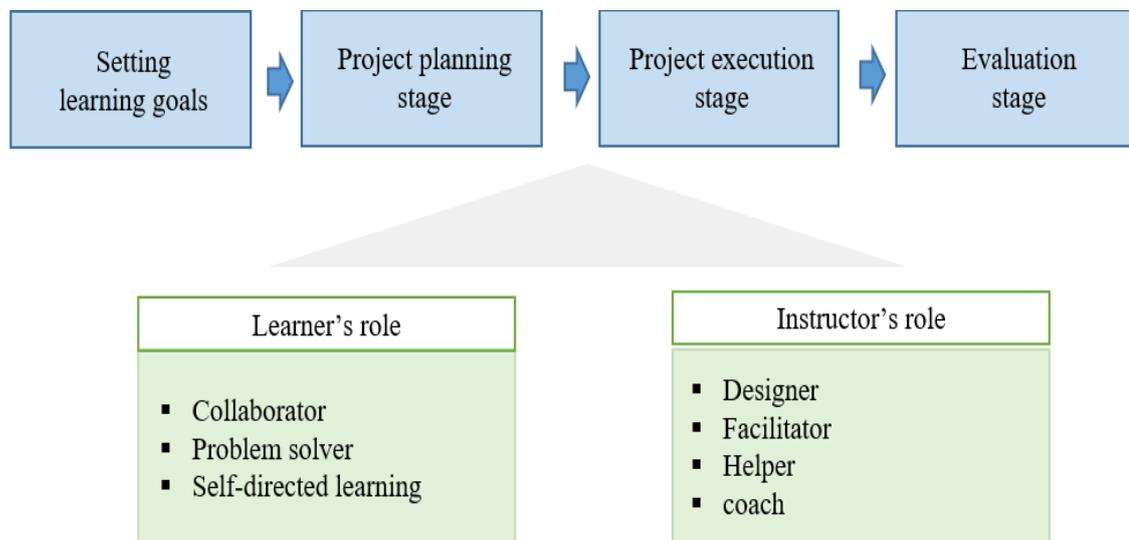


Figure 1. Project-based learning process

2. Materials and Methods

2.1. Design of Study

This study has a single-group, quasi-experimental design that measures differences before and after project-based learning to examine the effect of project-based learning on the nursing student.

2.2. Participants

G*Power 3.1 was used to calculate the number of samples. The number of samples for the one-tailed independent t-test calculated using the significance level ($\alpha=.05$), power ($1-\beta=.95$), and effect size ($f=.5$) was 34. Before conducting this study, students were informed that the course for the development and assessment of health programs is based on project-based learning, and only the students who agreed were selected as the participants. Participants were 71.5% female and 28.6% male, with an average of 22.6 years old. An orientation was held before class started to explain the

teaching process, learning method, assessment method, and roles of the professor and students to the participants.

2.3 Measurements

Creative personality refers to the motivation, attitudes, values, and cognitive styles that facilitate creative thinking and behavior, general characteristics shown by creative persons, and the stable and core attitude of an individual needed to manifest creativity.

The Creative Personality Scale-Revised (CPS-R) is used to measure creative personality [9]. This tool comprises eight sub-factors (Curiosity, Self-confidence, Imagination, Patience, Humor, Independence, Adventure, Openness) and 30 questions total. The tool had Cronbach's α of .82.

Table 1. Composition of Creative Personality

Sub-factors	Definition	Number of questions
Curiosity	Curiosity refers to the tendency to question and pay attention to surrounding objects and phenomena.	4
Self-confidence	Self-confidence refers to the tendency to think positively about one's creative capability and existence.	5
Imagination	Imagination refers to the tendency to enjoy imaginary situations.	4
Patience	Patience/attachment refers to the tendency to finish a given task despite any hardships.	5
Humor	Humor refers to the tendency to generate funny actions or thoughts.	4
Independence	Independence refers to the tendency to solve problems alone regardless of what other people think and assess.	2
Adventure	Adventure refers to the tendency to challenge tasks at risk of failing.	2
Openness	Openness refers to the tendency to accept new experiences and thoughts.	4

2.4. Nursing Intervention

The experimental treatment of this study is the 'Development and Evaluation of Health Programs' course that applied project-based learning. This three-credit course for fourth-year nursing students was operated for 15 weeks. Among three hours every week, one hour was spent on learning themes for project team activities, and two hours were used to engage in team activities led by team leaders. The learning objective of this course is to write a health project proposal. The participants were provided with basic data related to the local community. They worked as a team of four or five members to conduct 15 sessions of team activities such as data collection, field surveys, and discussions.

This course presented examples of each theme for the development of health programs so that each team can practice cooperative learning. After educating the participants on the learning themes before cooperative team activities, teams had discussions to solve problems associated with the given task for 90 minutes while the professor played the role of advising teams. During team activities, team members divided roles to find data, keep records, or prepare for the presentation. After the team activities, students presented their activities for 30 minutes, and the professor supervised Q&A and feedback sessions. After class, students were asked to write and submit a work journal and reflection paper describing their team activities.

2.5 Data Collection

Data were collected from August 23 until December 22, 2019. Project-based learning was operated for 15 weeks in 42 students who signed up for the 'Development and Assessment of Health Programs' course and agreed to the purpose of this study. Creative personality was measured before and after the application of project-based learning to verify the learning effect.

2.6 Data Analysis

The collected data were analyzed using the SPSS WIN 23.0 program. The reliability of tools was confirmed using Cronbach's α value. Descriptive statistical analysis was performed to identify the creative personality of the participants. Changes in the creative personality of the participants were analyzed to verify the effect of project-based learning by performing a paired t-test. The correlation among the sub-factor of creativity personality was analyzed using the Pearson correlation coefficient.

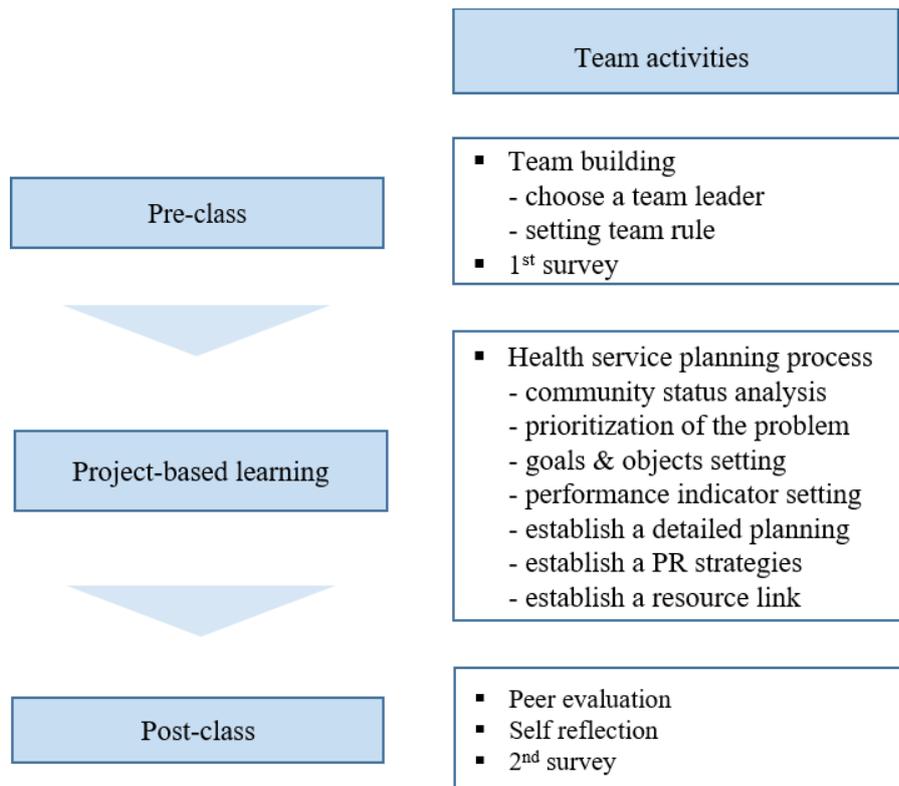


Figure 2. Project-based Learning team activities

3. Results

3.1. Effect of Project-Based Learning

When project-based learning was applied to undergraduate nursing students, changes in the creative personality was as presented in Table 2.

Before applying 15 sessions of project-based learning, the mean score was 2.92 for creative personality, 3.75 for teamwork competence, and 3.61 for self-regulated efficacy. After application, the mean score was significantly improved on the significance level of $p < .01$ to 3.77 for creative personality ($t=10.587$, $p=.000$). For the sub-factors of creative personality before applying 15 sessions of project-based learning, the mean score was 3.40 for curiosity, 3.67 for self-confidence, 3.69 for imagination, 3.14 for patience/attachment, 3.20 for humor, 3.50 for independence, 3.13 for

adventure, and 3.68 for openness. After application, the mean score was 3.74 for curiosity, 4.01 for self-confidence, 3.93 for imagination, 3.52 for patience/attachment, 3.61 for humor, 3.89 for independence, 3.61 for adventure, and 3.82 for openness. The score was significantly improved for curiosity ($t=2.883$, $p=.006$), self-confidence ($t=2.999$, $p=.005$), patience/attachment ($t=3.998$, $p=.000$), and independence ($t=2.963$, $p=.005$).

Table 2. The effects of Project-Based Learning

Variables	pre-test M±SD	post-test M±SD	t	p
Creative Personality	2.92±.39	3.77±.31	10.587	.000*
Curiosity	3.40±.59	3.74±.46	2.883	.006*
Self-confidence	3.67±.60	4.01±.39	2.999	.005*
Imagination	3.69±.71	3.93±.52	1.592	.119
Patience	3.14±.47	3.52±.38	3.998	.000*
Humor	3.20±.78	3.61±.63	2.494	.017
Independence	3.50±.68	3.89±.50	2.963	.005*
Adventure	3.13±.91	3.61±.81	2.388	.022
Openness	3.68±.47	3.82±.37	1.478	.147

*: $p<.05$

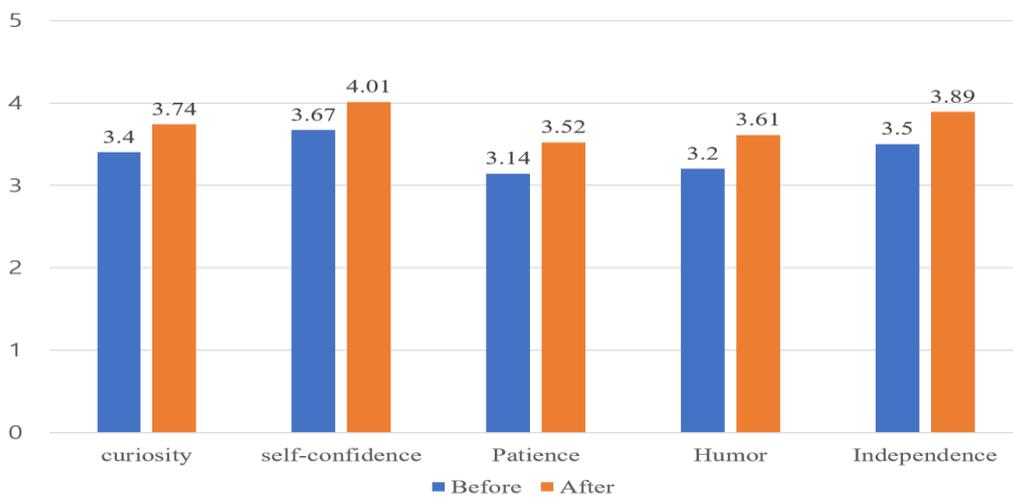


Figure 3. The effects of Project-Based Learning

3.2. Correlation Among the Variables

Looking at the correlation among the sub-factors of creative personality showed a significant positive correlation was shown by self-confidence ($r=.390$, $p=.011$), imagination ($r=.482$, $p=.001$), and humor ($r=.371$, $p=.015$) (Table 3).

Table 3. Correlation among sub-factors of creative personality

Scale	CP	CP_C	CP_S	CP_I	CP_P	CP_H	CP_In	CP_A	CP_O
CP	1								
CP_C	.692**	1							
CP_S	.701**	.309*	1						
CP_I	.866**	.541**	.598**	1					
CP_P	.490**	.360*	.246	.260	1				
CP_H	.723**	.420**	.400**	.555**	.333*	1			

CP_In	.272	.056	.351*	.260	.044	.040	1		
CP_A	.539**	.256	.234	.421**	.020	.292	.361*	1	
CP_O	.672**	.534**	.382*	.676**	.154	.300	.009	.374*	1

** : $p < .01$ * : $p < .05$

CP: Creative Personality CP_C: Curiosity CP_S: Self-confidence CP_I: Imagination CP_P: Patience/Attachment
CP_H: Humor CP_Ind: Independence CP_A: Adventure CP_O: Openness

4. Discussion

This study examined changes in creative personality by applying a project-based learning method as a way to improve the creative problem-solving ability of preliminary nurses. As a result, the project-based learning method significantly improved in all of the creative personality.

The results of this study agree with the results of previous studies [10-12]. Creative personality refers to the motivation, attitudes, values, and cognitive styles that facilitate creative thinking and behavior, general characteristics shown by creative persons, and the stable and core attitude of an individual needed to manifest creativity [8]. The results of this study showed that persons with a creative personality accept challenges to solve new problems and have a deep interest in and curiosity about their surroundings. They were also found to tend to finish difficult tasks with patience and maintain independence instead of being affected by the opinions of others.

In the sub-area of creative personality, curiosity, self-confidence, patience, humor, and independence were significantly improved. A creative person has a good sense of humor, confidence, and independence. Also, he has an excellent ability to cope with crises, and he is very curious and patient. A person who is open to new experiences, willing to take risks, and above all, have confidence and appetite for himself.

As a result of this study, the person who wants the future is a person who can solve problems with openness and confidence when facing new problems. In that respect, the nursing education method needs to be changed. It is believed that there is a need to change from the level of delivering simple knowledge to the level of having creative problem-solving skills for new things and capable of teamwork.

5. Conclusions

The effectiveness of learning activities practiced through cooperation and sharing among learners has been posed, and there is an increasing interest in the learning method to increase self-directed learning ability by enhancing the interaction and involvement of learners. Accordingly, this study aimed to examine the effect of a project course based on team activities on the creative personality. A project course with 15 sessions of weekly team activities was designed and applied to the 'Development and Assessment of Health Programs' subject. The results are as follows.

First, the 15-session project-based learning method significantly improved creative personality. Among the sub-factors of creative personality, curiosity, self-confidence, patience/attachment, and independence were significantly improved.

Second, the correlation among the sub-factors of creative personality showed a significant positive correlation with self-confidence, imagination, and humor. The results of this study showed that persons with a creative personality accept challenges to solve new problems and have a deep interest in and curiosity about their surroundings. They were also found to tend to finish difficult tasks with patience and maintain independence instead of being affected by the opinions of others. In particular, self-confidence is a tendency to think positively about one's creativity. The participants felt satisfied with turning the team project into an actual product.

6. Patents

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