

Development and Effect of a SnowBall Teaching-Learning Model based on Flipped Learning

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Abstract

In order to nurture nursing talents with good interest in learning as well as adaptability to the field, it is necessary to have conditions for self-directed learning, this study aimed to the creation of an educational environment and teaching-learning methods; thus, developing a model suitable for nursing students is essential. A snowball teaching-learning model based on flipped learning was developed and applied to nursing students' basic nursing practice classes in order to understand the effect on self-directed learning ability, interpersonal ability, and personality. For the study period, from September 1, 2015 to July 31, 2016, 21 second-year students in the Department of Nursing at University D, located in B city, Busan were recruited through convenience sampling. The collected data were analyzed using SPSS WIN (Ver. 21.0). The results of the study indicated there was a significant difference in the self-directed learning ability score from 3.16 ± 0.28 points before the teaching-learning model application to 3.99 ± 0.49 points after the application of the teaching-learning model. There was a significant difference in from 3.67 ± 0.49 points before application to 3.90 ± 0.43 points after application. There was also a significant difference in the personality score, from 3.69 ± 0.49 points before application of the teaching-learning model to 4.06 ± 0.46 points after application. Therefore, since the flipped learning-based snowball teaching-learning model is helpful in improving job competency, repeated experimental studies are suggested to verify the effectiveness.

Keywords: flipped learning, fundamental nursing practice, nursing students, snowball teaching-learning model, teaching and learning model

1. Introduction

The need to manage the quality of nursing education with constant improvement of nursing education programs is emphasized to produce competent nursing students with a sense of social responsibility to strengthen nursing education's future competitiveness in the rapidly changing society of science, technology, information, and communication (Korean Accreditation Board of Nursing Education, 2017). Accordingly, the Korean Accreditation Board of Nursing Education considers nurses' core competencies and includes them in the goals and learning outcomes of nursing education. The Board furthermore requires classes using various teaching-learning methods when carrying out theoretical education to reflect such core competencies (Korean Nursing Education Evaluation Institute). Lecture-style teaching methods are primarily used because the educational contents are vast and highly specialized, and it is necessary to create an educational environment where self-directed repetitive learning is possible in order to apply the theory learned to practice (Kang & Kang, 2021).

Flipped learning is a learning method which entails studying in advance using video lectures at home and solving problems through various activities in the classroom Kim (2016). Flipped learning, known as "flipped learning, flipped classroom," can reduce the gap between traditional classroom education and clinical practice, and is being utilized in nursing and medical education (Prober & Khan, 2013; Hawks, 2014). In addition, students can learn relevant content anytime, anywhere based on the spread of multimedia equipment and the development of information and communication technology. Disseminating flipped learning has become easier with excellent learning materials becoming accessible online, and interest is rising as it is widely used in nursing education (Lee, 2014). As flipped learning incorporates student-centered class activities, it provides opportunities for students to actively participate in class and effectively achieve academic performance due to active interaction between

instructors and learners (Lee & Le, 2016).

Brunner emphasizes the importance of the meaning of the generative structure of a subject or study, the value of a spiral curriculum, and the self-discovery ability through curriculum learning (Collins, 1990). Thus, based on the theory class in nursing class and based on Brunner's spiral theory, where one learns by applying to practice, a flipped learning-based snowball teaching-learning model that enables self-directed learning was developed in the process of expanding and deepening knowledge through repeated learning and practice.

Introductory nursing courses have classes in connection with theoretical courses and practice. Since theory courses precede practice courses, it becomes an important process to integrate practice based on a theoretical basis (Kim & Kim, 2017). Understanding of the contents of the practice may be insufficient as traditional basic nursing practice is conducted without preparation, and students practice independently, in groups or individually, after teaching and demonstration. There is a lack of opportunities to receive immediate feedback because the problem with one's practice is not identified (Lee & Shin, 2016). Also, students remain passive in teaching demonstrations or are not self-directed, showing a decrease in their interest in practice. This leads to a decrease in nursing students' satisfaction with practice and confidence during clinical practice, and students often feel intimidated and stressed (Kim, Chang, Kang, Kim, Kim, Kim, Park, Eom, Youn, Lee, & Won, 2011). Flipped learning is not a passive class but an active one that engages in discussion and action, which increases class participation and forms a positive learning culture (Kim, 2016). Therefore, positive effects of developing a teaching and learning model using flipped learning in basic nursing practice education are expected.

Self-directed learning ability is a learning method that manages and controls learning situations where one becomes the subject of learning and interacts with the instructor and is an active form of learning in which one takes responsibility for the learning results, and it is said that the higher self-directed learning abilities in nursing students mean higher clinical performance ability (Lee, Jun, Kim, & Woo, 2017; Park & Choi, 2020). Research states that a self-directed learning ability to actively engage in learning should be strengthened to play a professional role as a nurse (Jho & Chae, 2014).

Interpersonal skill is the ability to explore and understand others' perspectives, maintain a cooperative relationship, and live in harmony with others (Moon, 1980). This ability is essential for nurses, given the characteristics of nursing that require cooperation with medical staff in various occupations. Nursing students recognize interpersonal difficulties as the greatest difficulty they will face in the clinical field after graduation, and interpersonal skills can be considered an important competency not only for nurses but also for nursing students (Kim & Kim, 2011).

Personality is a human quality that refers to the characteristics of an individual's cognition, attitude, and behavior, and the need for personality education has been further emphasized as personality has emerged as a core competency in the era of the Fourth Industrial Revolution (Jee, 2017). In particular, the type of education for nurses, who deal with human life, is most important (Nam & Kim, 2018). Nurses with a specific type of personality considered to be the right type, have the image of a good nurse (Park, 2013).

So far, it has been reported that applying flipped learning to basic nursing practice education improves information utilization, critical thinking, self-directed learning, and problem-solving abilities (Kim & Kim, 2017; Jung & Yang, 2019; Choi & Kim, 2018; Yee, Ha, & Ahn, 2018; Saylo & Saylo, 2015). However, there have not been studies that show the effects of applying flipped learning to basic nursing practice education on personality and interpersonal skills.

This study developed a flipped learning-based snowball teaching-learning model, applied it to basic nursing practice courses, and identified the degree of self-directed learning ability, interpersonal skills, and personality of nursing students, and the specific objectives were as follows.

First, develop a flipped learning-based snowball teaching-learning model for nursing students.

Second, apply the teaching-learning model to the basic nursing practice courses. There will be a difference in the self-directed learning ability score of nursing college students.

Third, apply the teaching-learning model to the basic nursing practice courses. There will be a difference in the interpersonal skills scores of nursing students.

Fourth, apply the teaching-learning model to the basic nursing practice courses. There will be a difference in the personality scores of nursing students.

In line with this, the study aimed to develop a flipped learning-based snowball teaching-learning model, applied it to basic nursing practice classes, and identified its effect on self-directed learning ability, interpersonal skills, and

personality.

2. Method

2.1 Design

This study is an experimental study, similar to a single group pre-post test, to identify changes in self-directed learning ability, interpersonal skills, and personality by developing and applying a flipped learning-based snowball teaching-learning model for nursing students.

2.2 Instruments

2.2.1 Self-directed Learning Ability

Self-directed learning ability is a tool developed by Lee et al. (Lee, 2003) and consists of 45 questions for college students/adults. Detailed items consist of 20 questions on learning plans, 15 on learning implementation, and 10 on learning evaluation. Each question is rated on a 5-point Likert scale ranging from “very rarely” (1 point), “rarely” (2 points), “somewhat” (3 points), “often” (4 points), to “very often” (5 points), Higher scores signify higher self-directed learning ability. The initial tool’s Cronbach’s α was .93, and the Cronbach’s α of the current study was .92.

2.2.2 Interpersonal Skills

For interpersonal skills, Schlein and Guerney (1971)’s “Relationship Change Scale,” modified and supplemented by Moon (1980), was used. This tool comprises 25 questions, and the subscales are satisfaction (4 items), communication (4 items), trust (3 items), familiarity (3 items), sensitivity (2 items), openness (5 items), and understanding (4 items). Each question is rated on a five-point Likert scale ranging from “not at all” (1 point), “usually not” (2 points), “somewhat” (3 points), “usually so” (2 points), and “very much so” (1 point). Higher scores mean more positive interpersonal relationships. Cronbach’s α was .83 when the tool was developed, and Cronbach’s α of the present study was .89.

2.2.3 Personality

Personality is a tool developed by Hyun (2014) and consists of 70 questions developed for the personality level standardization test entrusted by the Ministry of Education to the Korea Educational Development Institute (KEDI). The subscales consist of seven questions on self-esteem, eight on sincerity, ten on consideration/communication, six on social responsibility, seven on courtesy, six on honesty/courage, six on wisdom, five on justice, and five on civility. Each question is rated on a 5-point Likert scale, from “not at all” (1 point), “somewhat not” (2 points), “usually” (3 points), and “very much so” (1 point). The higher the score, the higher the personality trait being measured. Cronbach’s α of the original instrument was .89, and Cronbach’s α was .87 in this study.

2.3 Research Participants and Data Collection Method and Period

The participants were 21 second-year students in the nursing department at University D, located in city B. The G*power 3.0 program was used to determine the minimum number of participants at a significance level α of .05, power $1-\beta$ of .95, and effect size of .75 as 21. Based on this minimum number of the sample, the target number was selected as 21, given the dropout rate and the number of students in practicum. The study period was from September 1, 2015 to July 31, 2016, and the purpose of the study was sufficiently explained. Students who consented to participate were required to take the basic nursing practice I course and fill out a self-report questionnaire before and after the course.

Flipped learning was applied to students taking the 15-week basic nursing practice course from March 2 to June 24, 2016, and the course was conducted by one researcher.

The first week was an orientation period where the general course, the concept of flipped learning, class operation methods, and learning methods were explained, and exploration was conducted, such as forming teams and deciding team rules for team operation. There were a total of five groups, each composed of four students. Class activities and practices were conducted in the same place by the same researcher. The basic nursing practice course consisted of two hours in three stages, i.e., pre-class, in-class, and post-class, and was operated this way except for the 8th and 15th test weeks.

2.4 Data Analysis

The collected data were analyzed using SPSS WIN (Ver. 21.0). The flipped learning-based snowball teaching-learning model for nursing students was applied to basic nursing practice, and the differences were analyzed

using χ^2 -test to identify the self-directed learning ability, interpersonal skills, and personality effects before and after the course.

3. Research Results

3.1 Development of the Flipped Learning-based Snowball Teaching-learning Model

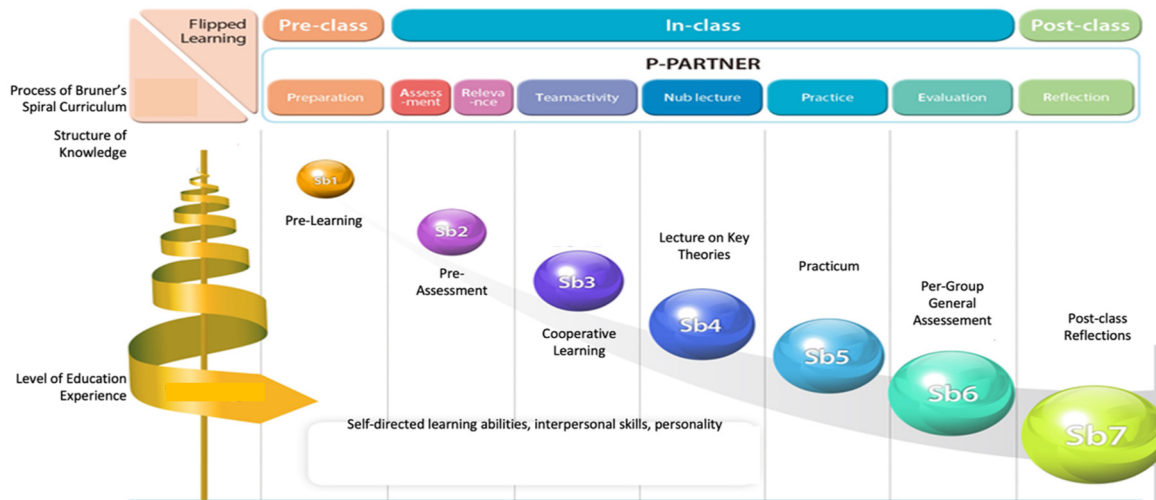


Figure 1. SnowBall Teaching-Learning Model based on Flipped Learning

In the present study, the P-PARTNER model, modified for practice, was developed and applied based on the PARTNER model (Choi & Kim, 2015), an applied model of flipped learning. The P-PARTNER model refers to classes consisting of pre-learning, pre-learning evaluation/relevance, cooperative learning, core summary lectures, practice, evaluation, and reflection.

The snowball teaching-learning model refers to a teaching and learning method in which the learning effect increases over the course of class activities, as a small snowball rolls and becomes a large one [Fig. 1]

The flipped learning teaching-learning model consists of seven stages and is named the PARTNER model (Hawks, 2014) by combining the first English letters of each stage. Given that this is a learner-centered instructional design, the instructor can be reinterpreted as a “partner” who helps learners change and grow instead of having a vertical relationship.

A needs analysis is first required as preparation for the pre-class. Learners, the environment, and subjects must be analyzed first. This is very important as a basic process of instructional design, and in particular, identifying learners' preferred sensory channels is useful as the baseline data for selecting an effective teaching media for each learner type. Moreover, the preparation stage provides video content, the source of pre-learning, and other materials that may be helpful for self-directed learning to LMS (Learning Management System). The second stage is pre-learning assessment, in which learners are assessed to see if they have actively acquired and understood the concepts in relation to the pre-learning content. Generally, online quizzes or assignments are given, and discussions or bulletin boards are utilized.

As the third step for entering the in-class, pre-learning relevance activities are developed. This is the most crucial stage of flipped learning, and it is a stage for announcing guidance and guidelines for transitioning the class content presented in pre-learning into cooperative learning. At this time, it is important to note that the instructor should not summarize the contents of the class provided in pre-learning or start the class with a lecture. The reason is that motivation decreases when another type of instructor-centered lecture is conducted during the relevance activities stage, and there is a concern that pre-learning may not be carried out properly due to the awareness that a summary lecture will be provided in the next session. The fourth stage is team activities, which are considered the core of flipped learning. It refers to securing in-class hours, perhaps the biggest reason for implementing flipped learning to better facilitate cooperative classes. At this stage, the instructor should promote collaboration between learners as a

facilitator, playing the role of a coach, and develop students' knowledge into in-depth learning through problem-solving. Fifth, core summary lectures must be provided. When solving problems through cooperative learning, the instructors are expected to coach without giving answers. At the end of the class, however, it is necessary to accurately convey whether the educational goals have been reached and the core contents. In the sixth stage, evaluation, evaluations are conducted for each class, individual, and team. Strategic evaluatory elements need to be composed of performance, structure, and general evaluations, taking into consideration the fact that evaluation cannot be performed in every class.

Reflection, a post-class stage, is a stage to reflect upon the task performance of teams and individual learning after each lecture, and applying it as an element of evaluation using LMS is another method. Burner's spiral curriculum-based snowball teaching-learning model refers to organizing the curriculum in a spiral manner to repeat the structure of the subject, which is the core idea of each subject, in a way that it can be taught more broadly as the age of the class or school class increases. First, it is organized so that the same content can be taught over and over again. Second, it is organized for students to be taught the curriculum more broadly and deeply so that their understanding takes an increasingly clear and mature form. This process means drawing a spiral around the most important concept in the composition of each subject's content, deepening and expanding it. By drawing a spiral around the core concepts of each subject, deepening and expanding it, it is possible to transfer knowledge gained to a similar field, one can develop an intellectual perspective related to the study by learning the methods of academic inquiry, students' voluntary inquiries are created even if it is not the instructor's one-way presentation and injection, it becomes easy to understand the subject, it becomes easy to memorize, and the gap between knowledge can be reduced (Park, 2019). The snowball teaching-learning model is a teaching and learning method based on Burner's spiral curriculum, which increases the level of learning by expanding the scope of knowledge as the core concept is deepened.

3.2 General Characteristics of Nursing Students

A total of 90.5% (n=19) of the participants were under the age of 22, and 9.5% (n=14) were over 22 years. 95.5% (n=20) were female and 4.8% (n=1) were male. Eighty point nine percent (n=17) reported their financial status as "normal," and none of the students had experienced flipped learning education [Table 1].

Table 1. General Characteristics of Nursing Students

Variables	Classification	n(%)
Age	<22	19(90.5)
	≥22	2(9.5)
Gender	Male	1(4.8)
	Female	20(95.2)
Economic status	Well-to do	3(14.3)
	Average	17(80.9)
	Poor	1(4.8)
Flipped Learning experience	Yes	0(0.0)
	No	21(100)

(N=21)

3.3 Applying the Flipped Learning-Based Snowball Teaching-Learning Model

Table 2. Differences in Self-Directed Learning Ability, Interpersonal Skills, and Personality Scores before and after Applying the Teaching and Learning Model

Variables	Pre M±SD	Post	t	p
Self-Directed Learning Ability	3.16±0.28	3.99±0.49	-7.749	<.001***
Interpersonal Skills	3.67±0.49	3.90±0.43	-3.674	.002**
Personality	3.69±0.49	4.06±0.46	-3.904	.001***

(N=21)

***p<.001, ** p<.01, * p<.05

Nursing students' score for self-directed learning ability showed a significant difference ($t=-7.749$, $p<.001$) from 3.16 ± 0.28 points out of 5 points prior to applying the snowball teaching-learning model to 3.99 ± 0.49 points afterwards. Interpersonal skills scores showed a significant difference ($t=-3.674$, $p=.002$) from 3.67 ± 0.49 points out of 5 points before applying the snowball teaching-learning model to 3.90 ± 0.43 points after. The personality score showed a significant difference ($t=-3.904$, $p=.001$) from 3.69 ± 0.49 points out of 5 points before applying the snowball teaching-learning model to 4.06 ± 0.46 points after (Table 2).

4. Discussion

The current study developed a flipped learning-based snowball teaching-learning model, applied it to basic nursing practice courses for nursing students, and identified its effects on self-directed learning ability, interpersonal skills, and personality. The main results of this study are as follows.

First, the teaching-learning model development emphasized the pre-learning stage in the PARTNER model study, an applied model of flipped learning by Choi and Kim (Choi & Kim, 2015). By drawing a spiral around the core concepts of each subject as emphasized in Brunner's spiral theory that was highlighted in Park (2019), it was attempted to develop a teaching-learning model. When deepened and expanded this model enables transfer to similar fields, self-directed expansion of knowledge by taking basic nursing practice classes through the practice of theoretical basis and integrative thinking from learning the academic inquiry methods, and improvement of the level of learning.

Second, developing a flipped learning-based snowball teaching-learning model and applying it to the basic nursing practice course resulted in a statistically significant difference in the self-directed learning ability of nursing students. This study was consistent with the results of Jung (2017) and Yang (2021) in that the flipped learning method improves self-directed learning ability. It is thought that the learning method was effective because PPT and video were provided as learning materials in advance in the pre-class stage, self-directed learning was encouraged before class, students checked each other's work through group activities, and writing a reflection to contemplate upon each team's task performance and individual learning after each class enabled the students to review.

Third, developing a flipped learning-based snowball teaching and applying it to basic nursing practice courses resulted in a statistically significant difference in nursing students' interpersonal skills and personality. Although no prior studies have applied flipped learning and verified its effectiveness, it was consistent with study results that improved communication skills (Lee & Eun, 2016). Since communication is a fundamental part of interpersonal skills, better communication skills lead to better interpersonal relationships. Furthermore, to improve interpersonal relationships, not only communication but also interpersonal skills and personality improvement programs that reflect various aspects such as personal characteristics and personality factors are needed. Through this, interpersonal difficulties in clinical practice after graduation are minimized, personality competencies are developed, and it is thought that this helps educate nurses with excellent clinical adaptation skills.

5. Conclusion and Suggestions

This study is an experimental study, similar to a single group pre-post test, designed to identify changes in self-directed learning ability, interpersonal skills, and personality in nursing students by developing and applying a flipped learning-based snowball teaching-learning model. The participants were 21 second-year students of the nursing department at University D, located in city B. The study period was from September 1, 2015 to July 31, 2016, and students who consented to participate were required to take the basic nursing practice I course and complete a self-report questionnaire. The study found that the flipped learning-based snowball teaching-learning model improves self-directed learning ability, interpersonal skills, and personality after education. Since this study was conducted on nursing students at a single university, there is a limit to generalizing it to all nursing students. It is hoped that the flipped learning-based snowball learning model will become the basic theory of repetitive learning in nursing education and serve as a cornerstone for improving the clinical adaptation ability of nursing students. The following suggestions are made based on the above results. First, it is suggested that the study on the developed flipped learning-based snowball teaching-learning model be repeated in a rigorous experimental study. Second, it is suggested to verify the systematization effect of repetitive learning using the developed flipped learning-based snowball teaching and learning method.

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