Nurse Education Today 83 (2019) 104191

Contents lists available at ScienceDirect

Nurse Education Today

journal homepage: www.elsevier.com/locate/nedt

# Effect of learning contracts in clinical pediatric nursing education on students' outcomes: A research article

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ARTICLE INFO

*Keywords:*
Learning contract
Clinical education
Pediatric nursing
Self-efficacy

ABSTRACT

*Background:* According to previous research, learning contracts positively influence learners' self-directed learning ability, learning satisfaction, and academic performance. However, there are insufficient researches on the application of learning contracts to clinical training in pediatric nursing. This study sought basic data for developing an effective teaching and learning strategy for clinical education in pediatric nursing.
*Objective:* This study aimed to validate the effect of learning contracts on students' problem-solving skills, self-directed learning capability, and communication self-efficacy.
*Design:* Nonequivalent control group posttest design.
*Participants and settings:* The participants comprised a total of 50 junior nursing students, 25 in each group at a college in Daejeon City, South Korea.
*Method:* This study compared the above-mentioned outcomes between control (before clinical pediatric nursing education) and experimental groups (after received such education and applied learning contracts).
*Results:* The experimental group demonstrated higher problem-solving skills, self-directed learning capability, and communication self-efficacy scores than did the control group.
*Conclusion:* Learning contracts should be applied in practical courses as a teaching and learning method to improve relevant nursing skills, such as problem-solving skills, self-directed learning capabilities, and communication self-efficacy.

## 1. Background

Advances in medical technology, improved living standards, and healthcare system reforms such as the creation of a comprehensive care service system have led to a surge in healthcare demands. To satisfy patients' varied and sophisticated health care requirements, nurses must be able to not only identify issues based on quick and accurate analytical judgments and analyze their causes, establish and implement nursing plans, and evaluate the results of these plans, but also effectively resolve various issues arising in practical settings (Lee et al., 2011). Kim and Park (2012) reported positive correlations of problem-solving processes with self-leadership and readiness for self-directed learning, while Shim and Oh (2012) identified self-directed learning motivation, attitudes toward learning, and academic self-efficacy as factors influencing nursing students' problem-solving capacity.

Problem-solving is the process of recognizing the gaps between one's current state and a goal state and then tackling the obstacles within this gap. Accordingly, problem-solving skills are the intellectual and creative abilities allowing an individual to quickly and effectively resolve these gaps (Lee et al., 2003). Problem-solving skill cannot be obtained within a short time but requires continuous, organized education. Therefore, there is a strong need for a curriculum that seeks autonomous learning by dealing with and solving problems in real life instead of a curriculum that centers on teaching by rote (Heidari and Shahbazi, 2016). Not only nurses, but also nursing students, require such problem-solving skills. This is because that problem-solving ability is an essential ability in nursing practice—nurses must be able to choose and apply information for their own purposes using their own knowledge (Choi et al., 2014). Furthermore, nursing is a discipline that has its roots in practice focusing on planning, performance, and evaluation based on a diagnosis of patients' health problems (Byeon, 2017). Therefore, nurses must be excellent problem solvers to provide safe and efficient nursing, and such an ability can be considered a must-have ability for nursing students, who are preliminary nurses (Papathanasiou et al., 2014).

In self-directed learning, students develop the ability to self-evaluate their own learning process and results through establishing learning goals, setting progress rates, and proactively managing the

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https://doi.org/10.1016/j.nedt.2019.08.009
Received 13 February 2019; Received in revised form 31 May 2019; Accepted 11 August 2019

planning, execution, and evaluation of learning on their own or through interaction with a collaborator. All the components of this process can affect problem-solving skills (Kwon, 2011). Self-directed learning has particular relevance in nursing education because of its applicability in both clinical practice and theoretical education contexts. Nurses who are well trained through self-directed learning have the necessary problem-solving skills to evaluate their current knowledge and technical skill, acquire necessary additional information, and independently solve problems and expand on them (Shim and Oh, 2012). Hence, students must be able to smoothly solve problems through communication and proficient nursing performance in highly complicated nursing situations. Above all, they require a self-directed learning attitude to ensure their continuous and professional growth (Patterson et al., 2002).

In the nursing context, communication self-efficacy pertains to a nurse's belief or judgment that they can effectively communicate with a patient (Larson and Daniels, 1998). The personal belief that they can successfully communicate with a patient can help nurses establish a facilitating therapeutic relationship during their counseling, thereby effecting positive change in the patient and ensuring successful treatment. Communication during clinical education can provide more opportunities for nursing students to improve their communication self-efficacy.

Learning contracts are a tool allowing the learner and teacher to establish a prearranged plan for learning experiences based on mutual understanding (Knowles et al., 1998). Knowles (1986) called learning contracts the most effective strategy to promote self-directedness in adult learners because they enhance learners' sense of responsibility and allow the establishment of learner-centered learning objectives. Previous research on learning contracts has found that learning contracts positively influence learners' self-directed learning ability, learning satisfaction, and academic performance (Frank and Scharff, 2013; Sajadi et al., 2017). There have been some studies on learning contracts in nursing, but they were primarily case studies of hospital-based clinical education (e.g., Kim and Cho, 2012; Park and Seong, 2017) and only utilized learning contracts to establish clinical practice goals. Nursing curricula should ultimately be developed and applied so that self-directed learning, critical thinking traits, and improvements in clinical performance fit the curriculum and characteristics of clinical training of each year (Yang, 2010). Accordingly, considering the insufficient research on the application of learning contracts to clinical training in pediatric nursing, it is necessary to conduct further research demonstrating how learning contracts influence clinical training.

The specific goal of a pediatric nursing clinical practice is to have an educational experience for the child's primary caregiver during the clinical practice period. Specifically, we expected to improve students' self-directed learning and problem-solving skills through the process of finding the parents' needs on the education for caring sick child, setting up education contents, and completing educational materials for care givers. Also, we expected to develop rapport with primary care givers and improve communication skills by actually educating parents considering their characteristics. The evaluation of learning outcomes was conducted through self-evaluation and peer review, and the final evaluation was made by the clinical practice instructors. Accordingly, the purpose of this study is to identify the impact of problem-solving skill, self-directed learning capability and communication self-efficacy of nursing students when the learning contract is applied to pediatric nursing clinical practicum. The following hypotheses were devised in pursuit of this aim:

**Hypothesis 1.** An experimental group that received practical clinical education in pediatric nursing utilizing learning contracts will demonstrate higher problem-solving skill scores than will a control group.

**Hypothesis 2.** The experimental group will demonstrate higher self-directed learning capability scores than will the control group.

**Hypothesis 3.** The experimental group will demonstrate higher communication self-efficacy scores than will the control group.

## 2. Methods

### 2.1. Research design

This study used a nonequivalent control group posttest design to compared to the problem-solving skills, self-directed learning capability, and communication self-efficacy between control group that had not yet experienced clinical education in pediatric nursing and those of an experimental group that had received such education that employed learning contracts.

### 2.2. Research subjects

The study was approved by the Internal Review Board (No: XXXXXX) of K University before commencing the research. All subjects were junior nursing students who applied for clinical pediatric nursing courses at K College of Nursing located in Daejeon City, South Korea from March to June 2018. Students who understood the study purpose and voluntarily consented to data acquisition were selected. They were also told that they could terminate participation at any point during the research period, all personal information acquired in this study would be held in strict confidentiality, and the data would not be used for any other purpose than the present research. At K Nursing College, a total of 150 students are divided into three classes, and due to the conditions during the clinical practice period, they are divided into one and two classes to conduct the clinical practicum and lecture sessions during Weeks 1 to 8 and class 2 during Weeks 9 to 16. The students scheduled for clinical practice in Week 9 to 16 were set as the control group, and the students scheduled in Weeks 1 to 8 were set as the experimental group. None of the subjects had prior experience of using learning contracts. In consideration of research ethics, all students, including control group students, were educated on learning contracts after study completion. The minimum sample size was 17 participants per group according to a power analysis (via G*power 3.1.7), with an effect size of 0.50, a power of 0.80, and a significance level of 0.05. Twenty people were selected for the experimental and control group each, in consideration of a 20% dropout rate. The total number of students who are under the clinical education in pediatric nursing during the course was 150, and the total number of students who agreed to participate in the study was 26.7% of the students.

### 2.3. Research procedure

#### 2.3.1. Planning and contract making

The present study was conducted from March 2 to June 15, 2018. The control group was examined between March 2 and April 26, 2018, while the experimental group was examined between April 30 and June 15, 2018, after they had completed the clinical pediatric nursing education involving learning contracts.

On the first day of the clinical practice, the purpose and procedures of the practice were explained in an orientation session, and learning contracts were signed only by students who agreed to participate in this study. Ample time was provided before commencement of the clinical practice for questions and feedback regarding the learning contracts. The entire clinical practice course lasted for five days over a single week (from Monday and Friday), for a total of 40 h. On the Friday, after the clinical practice session had finished, the learning contracts were terminated in a conference.

Prior to the commencement of the clinical education program, the author explained the purpose and methods of the clinical practice involving learning contracts to the field instructor of the pediatric nursing clinical ward and obtained their consent. When formulating the

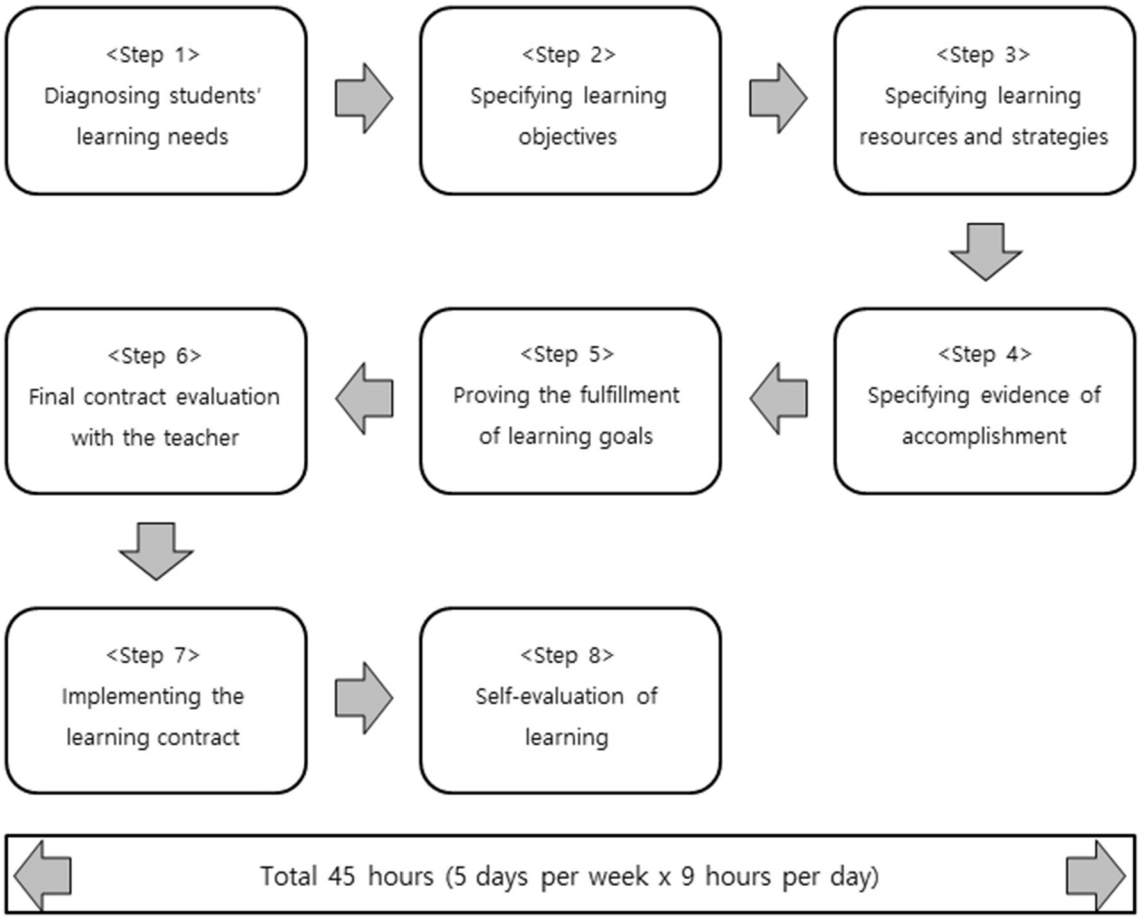


**Fig. 1.** Process of pediatric clinical practice applied learning contract.

learning contracts, the purpose and necessity of learning contracts, their concepts and processes, step-by-step instructions, announcements (wherein students were informed of the conferences that would be held after the course, giving them a chance to reflect on their experiences), and evaluations were all explained to the students, as none of them had ever participated in clinical practice after determining their own practical goals. Furthermore, it was made clear to students that the data obtained in this study would be used solely for research purposes and would not be used to form judgments about the students or influence their performance evaluation. The clinical education program applying learning contracts was designed based on the eight-stage development guidelines for forming learning contracts proposed by Knowles et al. (1998).

### 2.3.2. Process of Implementing the Leaning Contract

Fig. 1 presents the process of pediatric clinical practice applied learning contract in this study. In the first stage (diagnosing students' learning needs), students were provided with the necessary time to identify their own expectations and needs based on evaluations of the clinical pediatric nursing education they had received in the previous semester. In the second stage (specifying learning objectives), students set specific and realistic learning goals that they wished to achieve through the clinical practice. In the third stage (specifying learning resources and strategies), the author instructed the students to prioritize resources most readily accessible to them, such as pediatric nursing textbooks, guidelines, or the Internet. Students were also introduced to various methods, including educational leaflets used in pediatric wards and assistance from pediatric registered nurses and residents. The fourth stage (specifying evidence of accomplishment) involved specifying the sources of evidence in order to provide a reference point for the learner, thereby allowing them to evaluate their progress toward their specified learning goals (Sajadi et al., 2017). Parent education plans, case studies, and daily notes were utilized to this end. The contents of the learning contract designed by the students were related to the parent education, and the final education selected through finding parents' needs included the correct method of measuring the body temperature, fever care, fall prevention, chest physiotherapy such as percussion and posture drainage, using nebulizer, and so on. In the fifth stage (proving the fulfillment of learning goals), evaluation methods, standards, and criteria derived from the parent education plans, case studies, and daily notes were synthesized by students in groups and then modified through co-evaluation with the author. In the sixth stage (final contract evaluation with the teacher), students examined the specifics of the contract with the author, re-evaluated them with the field instructor, and further revised them. In the seventh stage (implementing the learning contract), students were informed that they could revise the learning contract to find alternative ways of achieving the established goals through discussions with the teacher and field instructor. They were also asked to contact the teacher or field instructor through emails, phone calls, or in person whenever they needed help. In the final stage (self-evaluation of learning), a conference was held after the practice sessions had ended, wherein students evaluated whether they had achieved the goals set in the learning contract and exchanged feedback.

### 2.3.3. Evaluating the Impact of Contract Learning

Self-evaluation sheets were used to evaluate the components of the learning contract, including learning goal achievement, problem-solving skills, learning attitude toward self-directed clinical practice, and communication skills. After exchanging feedback with the teacher and

classmates, the contract was declared terminated. The posttest survey was conducted after the education for the experimental group had completed. In this study, the survey on problem-solving skills, self-directed learning capability, and communication self -efficacy was the index to identify the impact of contract learning.

### 2.4. Measures

#### 2.4.1. Problem-solving skills

The problem-solving skill measurement tool for college students and adults, which is part of the Life Competencies Measurement Toolkit developed by the Korean Educational Development Institute (KEDI; Lee et al., 2003), was used to measure problem-solving skills. The tool comprises 45 items on a 5-point Likert scale, as follows: 5 = *Highly Likely*, 4 = *Quite Likely*, 3 = *Average*, 2 = *Unlikely*, and 1 = *Highly Unlikely*. A higher score indicates better problem-solving skills. The Cronbach's α of this tool was 0.94 at the time of its development, and 0.89 in this study.

#### 2.4.2. Self-directed learning capability

The self-directed learning capability measurement tool for college students and adults, also part of the Life Competencies Measurement Toolkit (Lee et al., 2003), was used to measure self-directed learning capability. The tool comprises 45 items categorized into three competencies and eight subcategories. The questions are graded on a 5-point Likert scale: 5 = *Highly Likely*, 4 = *Quite Likely*, 3 = *Average*, 2 = *Unlikely*, and 1 = *Highly Unlikely*. A higher score means indicates better self-directed learning capability. The Cronbach's α of the tool was 0.93 at the time of its development and 0.92 in this study.

#### 2.4.3. Communication self-efficacy

Park's communication self-efficacy scale (2012) was used to measure students' communication self-efficiency. This scale, re-translated into Korean by Park (2012), is based on the 37-item Counseling Self-Estimate Inventory (COSE) developed by Larson et al. (1992) and adapted by Hong (2001) into Korean for psychotherapists. The adapted scale comprises 37 items in five subcategories, and each item is rated on a 5-point Likert scale ranging from 1 = *Strongly Disagree* to 5 = *Strongly Agree*. Higher scores indicate greater communication self-efficacy. The Cronbach's α value was 0.74 at the time of development and 0.78 in this study.

### 2.5. Data analysis

Data were analyzed using the IBM SPSS Statistics 21.0 for Windows (IBM Corp., Armonk, NY). The general characteristics of the subjects were analyzed using descriptive statistics, and their homogeneity was analyzed using the chi-square test, Fisher's exact test, and *t*-test. Independent *t*-tests were used to test the hypotheses. The reliability of the measures was analyzed using Cronbach's α.

## 3. Results

### 3.1. Homogeneity testing

The sample comprised a total of 50 subjects, 25 in each group. Their average age was 22.7 years. Table 1 shows the homogeneity results of the experimental and control groups. Both groups both had three males (12%) and 22 females (88%). When asked whether they were satisfied with their major, four subjects (16%) in each group indicated dissatisfaction, while 10 (40%) chose "average" in the control group and 7 (28%) did so in the experimental group. Ten subjects (40%) in the control group reported being satisfied, while nine subjects (36%) reported being so in the experimental group. Three subjects (12%) in each group said that the examination grades had made them choose the nursing major. Furthermore, six subjects (24%) in each group mentioned aptitude and interest. Nine subjects (36%) in the control group and 12 subjects (48%) in the experimental group cited high employment rates. Five subjects (20%) in the control group and three subjects (12%) in the experimental group chose "suggestions from others" as their motive for pursuing a nursing career. There were no statistically meaningful differences between groups; their general characteristics were therefore considered homogeneous.

**Table 1**
Pre-test homogeneity testing based on general characteristics ($N = 50$).

| Variables | Categories | Control | Experiment | $\chi^2$ or $t$ | $p$ |
|---|---|---|---|---|---|
| | | *n* (%) | | | |
| Age, *M* (*SD*) | | 21.48 (0.92) | 22.0 (1.50) | 0.83 | .412 |
| Gender | Male | 3 (12.0) | 3 (12.0) | 0.43 | .478 |
| | Female | 22 (88.0) | 22 (88.0) | | |
| Satisfaction with Major | Very Unsatisfied | 1 (4.0) | 0 (0.0) | 0.41 | .521 |
| | Unsatisfied | 4 (16.0) | 4 (16.0) | | |
| | Average | 10 (40.0) | 7 (28.0) | | |
| | Satisfied | 10 (40.0) | 9 (36.0) | | |
| | Very Satisfied | 0 (0.0) | 5 (20.0) | | |
| Motivations for selecting a major | Examination Grades | 3 (12.0) | 3 (12.0) | 0.36 | .836 |
| | Aptitude/ Interest | 6 (24.0) | 6 (24.0) | | |
| | Employment Rate | 9 (36.0) | 12 (48.0) | | |
| | Suggestions | 5 (20.0) | 3 (12.0) | | |
| | Other | 2 (8.0) | 1 (4.0) | | |

*Note.* SD: Standard deviation.

### 3.2. Hypothesis validation

**Hypothesis 1.** There was a significant difference between the problem-solving skills of the control group ($M = 3.03$) and experimental group ($M = 3.53$) after the experiment ($t = 2.59$, $p = .014$). Hypothesis 1 was therefore supported (Table 2).

**Hypothesis 2.** There was a significant difference in the self-directed learning capability between the control group ($M = 3.32$) and the experimental group ($M = 3.77$; $t = 2.19$, $p = .033$). Hypothesis 2 was therefore supported (Table 2).

**Hypothesis 3.** Finally, there was a significant difference in communication self-efficacy between the control group ($M = 3.41$) and experimental group ($M = 3.80$; $t = 2.40$, $p = .020$). Hypothesis 3 was thus supported (Table 2).

## 4. Discussion

The present study aimed to validate the effect of clinical education in pediatric nursing utilizing learning contracts on problem-solving skills, self-directed learning capability, and communication self-efficacy in junior nursing students. The purpose was to provide basic data for

**Table 2**
Differences in problem-solving skills, self-directed learning capability, and communication self-efficacy between control and experimental groups (N = 50).

| Variables | Control | Experiment | $t$ | $p$ |
|---|---|---|---|---|
| | *M* (*SD*) | *M* (*SD*) | | |
| Problem solving | 3.03 (0.83) | 3.53 (0.43) | 2.59 | .014 |
| Self-directed learning | 3.32 (0.67) | 3.77 (0.77) | 2.19 | .033 |
| Communication self-efficacy | 3.41 (0.51) | 3.80 (0.63) | 2.40 | .020 |

*Note.* SD: Standard deviation.

developing effective teaching and learning strategies for use in clinical education in this field. Note that the relative absence of previous studies on this topic makes it difficult to compare the results with those of other studies; we have done so only hesitantly below.

First, a statistically significant difference was found in problem-solving skills between the control and experimental groups. Considering that part of the nurse's role is to identify and resolve patients' problems, critical thinking is essential in this field (LaMartina and Ward-Smith, 2014). Nurturing problem-solving skills in the nursing education curriculum can help cultivate critical thinking skills because, according to Yang (2010), "the ability to identify and solve the problem of the patient is considered to be one of the roles of nurses, and is also necessary for clinical practice." To improve problem-solving skills in clinical education—which should ideally be taught from the earliest possible stage of the nursing education—learning contracts could be applied. They might also help maintain appropriate learning motivation by orienting learners toward achieving objectives rather than competing with others. Educator support and guidance for students undertaking a learning contracts is essential to enhance confidence and facilitate to develop nursing skills (Bailey and Tuohy, 2009). Consultations between the teacher, field instructor, and learners could help improve learners' satisfaction with practical sessions and keep them motivated.

Second, problem-solving skills can be trained through learning-oriented self-directed learning (Lee and Park, 2016) and it is necessary for future nursing students to be able to communicate and solve various outcomes of the clinical practice, and effectively cope with complex working environments (Malekian et al., 2015). In the study on the demand of nursing students for clinical practice education (Kwon and Seo, 2012), the level of training required by professors in charge of clinical practice and training was high in the field of study. The application of the learning contract increases self-indulgence (Knowles et al., 1998) as the facilitator for the participation in clinical practice education from the initial stage of practical practice establishment. Thus, by acting as facilitators, professors and field leaders are important factors in achieving learners' learning effects through learning contracts (Knowles et al., 1998). In addition, reflecting the reality of current clinical practice education that can become indifferent to student education due to the increase in the number of clinical practicum students and the difficulty of paralleling work with nursing student training together with overtime work (Song and Kim, 2013; Struyf et al., 2005). Papathanasious et al.(2014) indicated that the gap between the expectations and reality of the clinical learning environments for the nursing students' individualization and involvement. In this study, learning contracts could be help to not only find learners' needs, but also facilitate learning motivation. Clinical practicum education confirmed that it is a teaching and learning method that can serve as a mediator for mutual consultation between learners, teachers, and field leaders to achieve one practical goal.

Third, the present study identified a significant difference in self-directed learning capabilities between the two groups. This finding somewhat accords with those of a previous study wherein learning contracts were implemented (Kwon and Seo, 2012) and changes in self-directedness examined; in that study, the authors found that learning contracts had positive effects on self-directed learning capability and comprehension (Sajadi et al., 2017). A nurse who is well-versed in self-directed learning can evaluate their current level of knowledge and performance, and can thereby independently obtain information needed to solve problems (Shim and Oh, 2012). Self-directed learning can further improve students' professional nursing skills from their first clinical practices by enhancing their confidence and ability to study independently (Song and Kim, 2015). Learning contracts could be a way to increase commitment and motivation, and lead to changes in learning-related behaviors in undergraduate courses (Frank and Scharff, 2013). Learning contracts in the present study appeared to help improve the self-directed learning capability of nursing students, perhaps because they helped enhance the students' motivation. Similar findings have been reported by Chein et al. (2002), and cultivating students' problem-solving abilities could improve their self-learning abilities (Struyf et al., 2005; Williams, 2004; Zhang et al., 2018). Moreover, applying an adequate, effective period to the contracts might be a suitable educational strategy for clinical practice. Timmins (2002) says that the learning contracts education could be a time consuming exercise at large class sizes. However, it was proper to use the learning contracts for a clinical practice session in this study because it was able communicate and give feedback in each small group.

Forth, there were significant differences in communication self-efficacy between the two groups. This difference is potentially caused by their interactions with parents and guardians during the education period, which helps them in forming trust with these individuals. The parent education material, which focuses on enhancing communication with parents of pediatric patients, might also have played a role. Communication self-efficacy pertains to counselors' belief that they can effectively counsel and help a client with their own technique and skills. Cho's (2014) study on the demand for education on communication reported that nursing students preferred activity-focused education. Moreover, role-playing was found to be the most effective teaching strategy for improving communication. These findings from the previous and present study show that direct engagement is important for improving communication in nursing education (Bailey and Tuohy, 2009). The communication facilitated through learning contracts could have helped improve nursing students' communication self-efficacy, and thereby enable effective communication with the client and promote a therapeutic relationship. As such, the present study confirmed that clinical education utilizing learning contracts could improve communication self-efficacy.

## 5. Conclusion

In conclusion, learning contracts could be applied to various practice courses as a type of teaching and learning method to improve nurses' problem-solving skills, self-directed learning capability, and communication self-efficacy. A systematic and effective clinical education program that reflects nursing students' learning demands for clinical education, as well as the teaching demands of the clinical field, is also warranted.

## Funding

This study did not receive any funding.

## Acknowledgments/contributions

All authors made substantial contributions to all of the following: (1) the conception and design of the study, or acquisition of data, or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content, (3) final approval of the version to be submitted.

## Declaration of competing interest

The authors have no conflict of interest.

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