

# Effectiveness of Video Recording and Self-Evaluation for Skill Training in Undergraduate Nursing Education

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## Abstract

**Background/Objectives:** In present nursing education, educators worked to apply new educational strategies that made use of technological development. Evidence emerged for the effectiveness of video-recording and self-evaluating to motivate students' self-directed learning.

**Method/Statistical Analysis:** This study evaluated the effectiveness of a skill-training program using video recording and self-evaluation. A quasi-experimental design was used such that 43 students were allocated into experimental (n = 22) and control groups (n = 21). Prior to the intervention, confidence to practice and problem-solving ability were assessed and actual performance of each core nursing skill added to the post experimental evaluation. For statistical data analysis, paired t-test, independent t-test, X2-test/Fisher's exact test and Mann-Whitney U test were conducted. SPSS was used and statistical significance was determined at the  $p < .05$  level.

**Findings:** Comparing posttest scores, study results showed statistically significantly better performance in nursing skills ( $p < .001$ ) and confidence to practice ( $t = 2.95, p = .003$ ) in the experimental group. The change of scores in the experimental group on confidence to practice statistically significantly improved in the experimental group compared to changed scores in the control group. No statistically significant difference emerged in problem-solving ability.

**Improvements/Applications:** Based on the study findings, video recording and self-evaluation provided effective training on core nursing skills. However, caution is needed as no clear evidence emerged for problem solving, which is a critical element in nursing education. Thus, we recommend the use of these strategies as a supplement to clinical placement. Future interventions need to provide additional strategies with robust study designs using randomized controlled trials.

**Keywords:** *Nursing students, Core nursing skills, Performance, Self-confidence, Problem-solving.*

## Introduction

In undergraduate nursing education, researchers have identified limitations in the clinical practice of nursing students, due to safety issues for students and

patients<sup>[1]</sup>. At present, clinical practice largely depends on the observation that students lack direct practice of nursing skills. Nevertheless, a growing need exists for verification of practical capability in nursing students before graduation<sup>[2]</sup>.

Nursing is a discipline based on practice and the integration of theory and practice in buoying nursing skill is a crucial part of the nursing curriculum<sup>[1]</sup>. Adequate programs must guarantee students obtain knowledge and skills. Nursing students desires more opportunities for real-world training rather than classroom-based

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theoretical lectures<sup>[3]</sup>. Nursing educators have tried to satisfy students' desires; however, nursing education is working to support rapid increases in the number of nursing students in Korea.

For the performance evaluation of nursing students, the Korean Accreditation Board of Nursing Evaluation<sup>[4]</sup> has developed 20 core nursing skills that are essential for students to achieve to the standard. Traditionally, education to attain these nursing skills involves theoretical lecture and demonstration. Additionally, given the importance of repetitive practice, educators developed strategies for effective training. To encourage practice of nursing skills, most schools offer students chances to self-practice what they have learned and incorporated active learning as a requirement educators expect from individual students<sup>[5]</sup>.

The training of students for nursing skills requires tremendous effort. Previous studies identified that technologies could ease the burden of educators<sup>[6]</sup>. Rapid changes in science and technology enable educators to revise the curriculum by adapting technology development<sup>[6]</sup>. Previous reviews revealed the effectiveness of skill-training education using video recording<sup>[7-8]</sup>. Students have an opportunity to closely observe their own performance, using video recording in skill practice. Along with video recording, students self-evaluation provides a means for educators to resolve issues in nursing education, such as the high student-faculty ratio.

However, without a proper evaluation process, the effectiveness of video recording cannot be guaranteed. Previous study identified the effectiveness of video recordings based on self-assessment; that is, students review their own performance using video and a checklist; this detailed evaluation ensures fast and precise correction<sup>[9]</sup>. Moreover, students can be motivated during the evaluation process, which is one effective strategy leading to self-regulated learning. As a self-regulated learning strategy, self-evaluation is a key factor that promotes students' commitment to learning<sup>[10]</sup>. Strong evidence suggests the efficacy of self-evaluation, during which individuals obtain comprehensive knowledge.

Previous studies identified several variables influencing the development of professionalism in nursing students including confidence to practice and the ability to solve problems<sup>[11]</sup>. When nursing education uses models rather than real human bodies, new nurses

often report lack of competency when practicing on actual patients. Adequate and repetitive practice with a chance to reflect on their practice would effectively improve nurses' confidence to practice skills<sup>[12]</sup>. Having students reach a standard level in nursing skill would eventually ensure the quality of care in their future practice.

In addition to confidence, nurses should be able to provide care that is optimal to the situation and time. Knowing the priorities and urgency, nurses would produce best patient outcomes with adequate problem-solving ability. Thus current nursing-education program should be designed to incorporate content to improve confidence and the ability to solve problems.

Although evidence suggested the advantage of using video recording and self-evaluation, a scarcity of education programs used both strategies for skill training. Such sparse use may discourage nursing educators from actively replicating the use of these strategies. Thus, the present study was designed to evaluate the education program for skill practice using video recordings and self-evaluation.

## Method

1. **Design:** In this study, we used a quasi-experimental design including an intervention and comparison of groups with pre- and posttest assessment.
2. **Implementation:** The intervention was implemented over 3-month period. The intervention group engaged in video recordings of core nursing-skill practice and self-evaluation whereas the comparison group remained in traditional training. Students in the experimental group were taught how to video record during skill training and evaluate the performance of themselves during 2 hours of open lab. These students were also encouraged to participate in a group-discussion session when they experienced difficulty in examining each other.
3. **Participants and setting:** All undergraduate nursing students attending the 4th-year curriculum at one university located in J district in Korea were invited to participate. A convenience sample of 43 students was recruited. The intervention took place in a practice room that had all the materials to practice two core skills—intramuscular injection and suction—with supervision by a trained research assistant.

**4. Instrument:**

**Performance Score:** To evaluate the performance of nursing core skills, a researcher developed a checklist. Two research assistant with teaching experienced in fundamental nursing evaluated performance independently. The inter-rater reliability was good (ICC=.907).

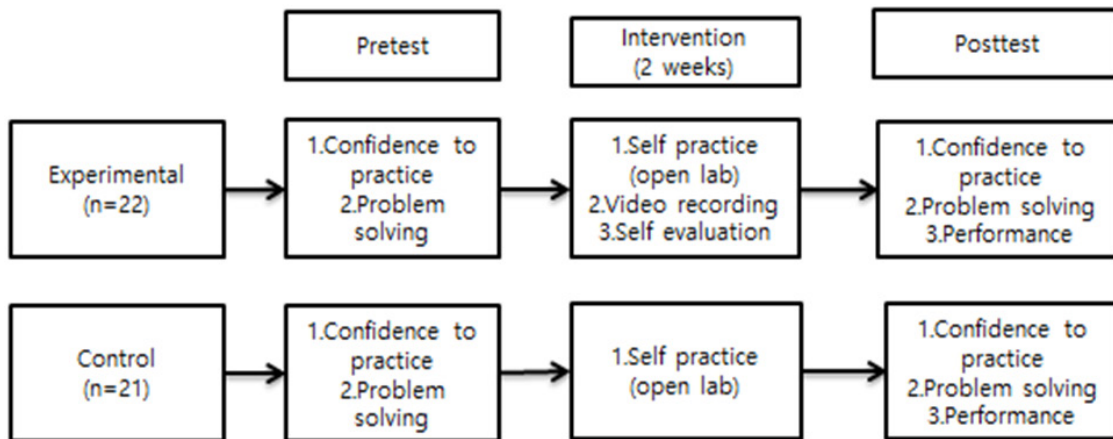
The performance was evaluated for skills of intramuscular injection and suction with a maximum score of 100. Higher scores indicate better performance of individual participants.

**Confidence to Practice:** To evaluate the confidence to practice, a numerical rating scale (NRS) was used. Study participants rated their level of confidence on a scale scoring between 10 (not confident at all) and 100 (very confident).

**Problem Solving:** We used a measurement developed by Woo<sup>[13]</sup> to evaluate the problem-solving ability

of study participants. A total of 25 items consist of discovery of problems (5 items), running problem solutions (5 items), designing problem solutions (5 items), and reviewing problem solving (5 items). Higher scores indicate better capability to engage in the process of solving problems. The Cronbach's alpha for this measurement was .90<sup>[13]</sup>.

**5. Data Collection:** To compare groups in terms of students' scores on performance, confidence to practice, and problem solving, we collected data for confidence to practice and problem solving before and after they had skill training using video recording and self-evaluation in the intervention group and traditional training in the control group. We obtained only the posttest data for the performance score of participants. We conducted the pretest before the first day of open lab and the posttest 2 weeks later. One researcher (initial) who was blinded, evaluated the video recording to examine individual students' performances [Figure 1].



**Figure 1. Research design**

**6. Statistical Analysis:** We used SPSS,  $\chi^2$ -test/ Fisher's exact test, and the Mann-Whitney U test for statistical analysis. Statistical significance was determined at the  $p < .05$  level.

**Result**

The sample includes 22 students in the experimental group and 21 students in the control group with a mean age of 22.95 and 22.99 years, respectively. The majority of both groups showed good satisfaction in nursing major (77.3% and 76.2%) and fair to good self-expression (90.9% and 90.5%). The homogeneity test between the experimental and control groups showed no statistical

significance between groups in general characteristics and baseline scores of study variables [Table 1].

A statistically significant difference emerged between the experimental and control group in performance scores in both skills ( $p < .001$ ) and confidence to practice ( $p = .003$ ). No statistically significant difference arose for confidence to practice and problem solving between the experimental and control groups (see Table 2).

The experimental group showed greater score increases for confidence to practice and problem solving. Comparing changed score between groups, increased scores of confidence to practice were statistically significant [Table 3].

**Table 1. Homogeneity test for general characteristics between experimental and control group (N=43)**

Characteristics	Exp. (n = 22)				Cont. (n = 21)				$\chi^2$ or t	p
	n	%	M	SD	n	%	M	SD		
<b>Satisfaction with nursing</b>										
Good	17	77.3			16	76.2			0.10	1.000
Fair	5	22.7			5	23.8				
<b>Self-expression</b>										
Good	7	31.8			7	33.3			0.50*	1.000
Fair	13	59.1			12	57.1				
Poor	2	9.1			2	9.5				
Age (yr)			22.95	1.59			22.99	1.68	-0.16	.900
Confidence to practice			6.35	0.96			6.40	1.00	-0.53	.503
Problem solving			3.80	0.34			3.78	0.36	0.49	.519
Academic credits of fundamental nursing			4.20	5.99			4.24	6.25	-0.79	.429

**Table 2. Comparisons of post-test outcome variables between experimental and control groups (N=43)**

Characteristics	Exp. (n = 22)		Cont. (n = 21)		t or z	p
	M	SD	M	SD		
<b>Performance Score</b>						
IM injection	85.16	6.98	76.95	7.01	7.69	< .001
Suction	85.33	5.77	77.99	6.09	7.42	< .001

Exp: Experimental group, Cont.: Control group, \* Mann-Whitney U test IM: Intramuscular

**Table 3. Comparisons of changed scores between experimental and control groups (N=43)**

Characteristics	Group	Pretest		Posttest		Difference		z	p
		M	SD	M	SD	M	SD		
Confidence to Practice	Exp. (n = 22)	6.35	0.96	7.32	0.91	0.97	1.13	3.52	.001
	Cont. (n = 21)	6.40	1.00	6.69	0.98	0.29	1.11		
Problem Solving	Exp. (n = 22)	3.80	0.34	3.90	0.39	0.10	0.51	0.56	.584
	Cont. (n = 21)	3.78	0.36	3.80	0.41	0.02	0.551		

### Discussion

The present study evaluated the effects of using video recording and self-evaluation to assist nursing students to attain core skills in nursing education. The implications of the strategies of self-directed learning and technology are that students are able to view their performance and figure out what they should work to improve. Findings demonstrated statistically significant effects on performance and confidence to practice in nursing students using video recording and self-evaluation.

The performance scores for the experimental group were statistically significantly higher than those of the control group. According to the classification by the Korean Accreditation Board of Nursing Evaluation<sup>[4]</sup>, intramuscular injection and suction ranked moderate and high, respectively, in levels of difficulty. Thus, findings from this study indicated broad applicability of the present intervention across all 20 core nursing skills. However, appropriate caution should be exercised before a conclusion can be drawn on the effectiveness of video recording and self-evaluation. Supervision and timely feedback from qualified educators should be arranged first to ensure the acquisition of students

accurate nursing skills<sup>[14]</sup>.

Compared with the control group, the intervention group showed statistically significant improvement in confidence to practice after 2 weeks. Similar results emerged in a previous study using review of video tapes for self-performance of foley-catheterization skills<sup>[15]</sup>. In that study, students reported enhanced self-awareness, thereby motivating them to practice more. Video recording and self-evaluation are strategies that could motivate students, leading to self-regulated learning<sup>[16]</sup>. Moreover, viewing their own performance with self-evaluation, students better analyzed what they did wrong and where they need to improve.

Unlike performance and confidence, problem solving showed no statistically significant difference between the experimental and control groups. Problem solving is an essential ability in which nursing students achieve capacity to plan and provide safe and quality nursing care<sup>[17]</sup>. Previous studies conducting simulation-based learning using standardized patients showed statistically significant improvement in students' ability to solve problems<sup>[18]</sup>. Facing a real person in a complex clinical situation, students more actively engage in learning, achieving greater problem-solving ability. In addition, the short period of intervention showed the ability to think critically and engage actively, both skills necessary to effectively solve problems. Considering the present results, additional strategies may necessary. We suggest future studies investigate the effects of interventions with complex designs that focus on problem-solving skills.

This study was not without limitations. Using quasi-experimental design, convenience sampling may influence the results, because randomized controlled trials (RCTs) are the gold standard in evidence-based nursing practice. In addition, although we included a performance assessment by an expert to draw more reliable evidence than self-reported results alone, the blinding of the assessor could not be ensured, which could also affect the results of study. We suggest that well-designed RCTs in future studies may to provide more conclusive results.

### Conclusion

A quasi-experimental design was used to identify an effective skill-training program using video recording and self-evaluation. Study results partially showed that students in the experimental group achieved better

performance scores and more confidence to practice. Caution is needed in the application of these strategies when considering replacing traditional training to help students attain nursing skills. These strategies can be an effective supplement to theoretical lectures and clinical placement. We suggest future researchers and educators implement interventions incorporating additional strategies with robust RCT designs.

**Ethical Clearance:** Not required

**Source of Funding:** Self

**Conflict of Interest:** Nil

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