

# The Relationship between Nursing Students' Attitudes towards Learning and Effects of Self-learning System Using Kinect

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**Abstract.** The purpose of this study is to clarify the relationship between nursing students' attitudes towards learning and effects of Kinect self-learning system for skill acquisition. Five students received feedback after each performance from the Kinect self-learning system. The students' performance was evaluated before (pre-test) and after (post-test) using 21 checkpoints. In order to investigate the students' attitudes towards learning, a survey questionnaire was distributed before the study. Based on the score, each student's attitudes towards learning were identified as either "active" or "passive". The difference between the pre-test and post-test scores for each student was calculated. Pearson product-moment correlation coefficients were calculated of the difference in the number of learning characteristics. There was a strong negative correlation between learning characteristic (Passive learning attitude) and the difference of score ( $r=-.80$   $p=.11$ ). From this study, it is recommended that the Kinect self-learning system is not effective for skill acquisition for students whose attitudes were passive.

**Keywords:** Kinect, Medical Error & Simulation, Nursing Student, Nursing skill, Nursing Education.

## 1 Introduction

Nursing education is always challenging because it covers three domains of learning such as cognitive, psychomotor, and affective. In nursing programs, students have to spend many hours in lab and clinical practicum in order to acquire

nursing skills to give appropriate care for clients. Nursing skills such as giving injections, taking vital signs, and giving bed bath require fine physical coordination of care givers. For nursing students, teachers design effective and efficient ways of teaching nursing skills. Contrary to faculty's device, new graduates indicated only four skills which they have confidence to perform out of 104 skills expected to acquire [1].

In current clinical practice, demand for new graduates has become higher due to development of high technology, increase numbers of elderly clients, and increase high acuity level of inpatients. Compare to the past, chances of giving direct patient care by nursing students have become limited because of patient safety reasons and of high demand from patients. This would be one of the reasons for less confident among new graduates when giving care.

There is a need for strengthening students' skill during course work not only in clinical practicum but also in lab rooms on campus. Nursing students have to learn many nursing care skills in the limited time period. In classroom settings, the average hours for each student to learn one skill under faculty's supervision is 9.4 minutes [2]. In order for students to acquire skills, they have to spend a quite amount of time in the lab room. Students practice nursing care skills with other students in the lab rooms in which faculty members may not always attend. While students practice skills by trial and errors, they receive feedback from other students. The feedback, however, may not always be correct [3].

One of the ideal teaching methods for skill acquisition is to teach man-to-man method. The study indicated that the students acquired the skills with using this method [4]. This method, however, is not feasible due to the limited time and numbers of faculty.

For the past four years, the researchers have been investigating how nursing students acquire nursing care skills effectively and efficiently. The first study was conducted using accelerometers. Out of 14 nursing care items, transfer skills were identified by accelerometers [5]. Using accelerometers, a model performance of transfer a patient from bed to wheelchair was investigated. The visual patterns of a model performance of this transfer skill were identified. The data collection of this transfer skill was conducted using 10 nursing students. It was obvious that the visual patterns of this performance by nursing students were deviated from the patterns of the model performance. If nursing students can visualize the differences in patterns of the performance in lab rooms, they are able to acquire skills efficiently. Based on these studies, the self-learning system with accelerometers was developed.

The researchers investigated the effect of accelerometers for nursing students. An experimental study was conducted for a transfer skill using 10 nursing students (5 for experiment group and 5 for control group). For the experimental group, the students received feedback after the performance based on the results of patterns of the performance. For the control group, the students practice a transfer skill in a

traditional way such as watching the video and practicing in the lab room. The result indicated that the students in the experimental group improved the transfer skill compared with those in the control group ( $p < .05$ ) [6].

One of the weaknesses of using accelerometers is inconvenience. It takes time to put accelerometers in certain areas of the body. The researchers used Kinect instead of accelerometers. The study for investigating the effect of Kinect was conducted. Using a Kinect system, an experimental study was carried out. The nursing students in the experimental group significantly improved the transfer skill [7]. Although the average score of the experimental group was statistically higher ( $p < .05$ ), a student did not improve the skill. The researchers speculated the reasons for this result. One of the reasons could be students' attitudes towards using a Kinect system. It is necessary to investigate reasons.

## 2 Purpose

The purpose of this study is to clarify the relationship between nursing students' attitudes towards learning and effects of Kinect self-learning system for skill acquisition.

## 3 Methods

Five freshman students participated in the study. The skill which the students had to learn was transferring a patient from the bed to wheelchair.

The Kinect self-learning system with which the students received feedback after each performance. The students were allowed to spend 20 minutes to practice using the system. The students' performance was evaluated before (pre-test) and after (post-test) using 21 checkpoints (Table 1). Each checkpoint was allocated as one point. The total points were summed.

To check the statistical significance, the calculation of Student's t-test carried out by the difference in the number of Pre-test and Post-test for each student.

In order to investigate the students' attitudes towards learning, a survey questionnaire was distributed at the beginning of the study (Table 2). Students were asked to answer each question with a five-point Likert scale. The questionnaire consists of two different attitudes towards learning: „active“ and „passive“. The scores were summed separately in „active“ and „passive“ for each student. The students were identified as either „active learning attitude“ and „passive learning attitude“ based on the scores [9].

The difference between the pre-test and post-test scores for each student was calculated. Pearson product-moment correlation coefficients were calculated and the difference in the number of learning characteristics.

**Table 1.** Evaluation items for transferring a patient from the bed to wheelchair

No.	Evaluation Items
1-a	Set wheelchair at the side of the bed with 20 to 30-degree angle
1-b	Place wheelchair close to the patient
2	Apply brakes
3-a	Place nurse's left feet forward and right leg backward when bringing the patient close to the edge of the bed
3-b	Place nurse's left leg between patient's legs
4-a	Support patient's hip
4-b	When bringing the patient close to the edge of the bed, move the patient's center of the gravity to right and left
5	Bring patient's heels close to the bed
6	Place patient's both arms around nurse's shoulder
7	Support patient's waist
8-a	Place nurse's left feet forward and right leg backward when patient stands up
8-b	Place nurse's foot between patient's legs
9-a	Bend nurse's knees
9-b	Patient stands up like bowing
10	Turn patient toward the wheelchair
11-a	Nurse bends the knees while placing the patient in the wheelchair
11-b	Patient sits down in the wheelchair like bowing
12	Hold patient's forearm from behind the patient and the patient's both the side
13	Bring the patient's buttocks towards the back of the wheelchair while placing patient's head lower
14-a	Bring down footrest of the wheelchair
14-b	Place patient's feet on the footrest

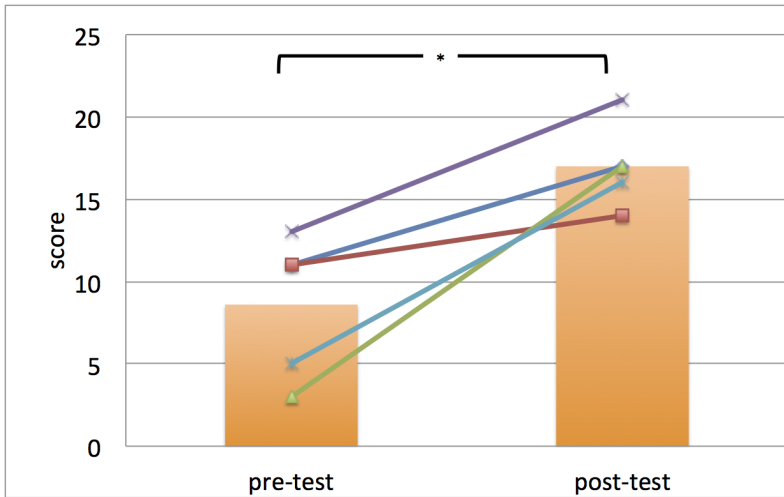
**Table 2.** Questionnaire items of students' attitudes towards learning

items	Attitudes
A better way of learning at college is that students devise themselves.	active
A better way of learning at college is that students are taught by faculty in classrooms.	passive
I prefer to take courses which I am interested in though it might be difficult to earn credits.	active
I prefer to take courses which are easy to earn credits.	passive
It is preferable that students actively involve with study in the classroom.	active
It is preferable that students listen to the lectures in classrooms.	passive

## 4 Results

The average pre-test score was 8.6 with the range between 3 and 13 (SD 4.34). The average post-test score was 17 with the range between 14 and 21 (SD 2.55) (Fig. 1). There was a statistically significant difference in the Pre-test score and Post-test score ( $t=-4.39$   $p=.01$ ).

There was a strong negative correlation between learning characteristic (Passive learning attitude) and the difference of score ( $r=-.80$   $p=.11$ ).



**Fig. 1.** Correlation of Score (Pre-test and Post-test). Line graph are total score of students. Bar chart is average pre-test and post-test score. Student's t-test  $*P < .05$ .

## 5 Discussion

Based on this study, effect of using Kinect is directly related to learners' attitudes towards Kinect. The learners' attitudes could be affected by the environment. For this data collection in the experimental group, the students were surrounded by many devices and several people operating the devices. This environment might create a feeling of pressure and threats to some students. The researchers' goal is to develop the Kinect self-learning system built in the room so that learners would not be surrounded by many devices and people. Using the Kinect self-learning system, students are able to practice as many times as they wish. Moreover, they receive feedback from the system so that they can assess their weaknesses immediately after their performance.

Faculty's challenge for investigating effective and efficient teaching/learning methods for nursing care skills acquisition continues as higher demands for nurses in clinical settings.

The limitation of this study is the numbers of subjects. In order to generalize the result, replication of the study is essential.

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