# Satisfaction And Self-Confidence Of Nursing Students In Learning Using 3D Simulators

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**Abstract**

Face-to-face simulation requires a lot of resources, such as space, time, and cost. These obstacles encourage educators to look for learning technologies that can provide realistic learning opportunities and be accessed flexibly, one of which is by using virtual simulations such as 3D simulators. The effectiveness of 3D simulator as learning media can be assessed through student satisfaction and self-confidence. This study aims to identify nursing students' satisfaction and self-confidence in learning using 3D simulators. The research design used was descriptive quantitative. The sampling technique used was purposive sampling with a sample of 67 nursing students. The instrument used was the Student Satisfaction and Self-Confidence in Learning Scale (SCSL). Data analysis was carried out using univariate analysis. This study showed that students were very satisfied (M = 4.415; SD = 0.489 n=44 ) and very confident (M = 4.338; SD = 0.419 n=39) in learning using a 3D simulator. High satisfaction and self-confidence in using 3D simulators were obtained. The 3D simulator can be a supporting media that can be used in several nursing courses to prepare for practicum and as a medium for reviewing practicum that has been done.

**Keywords:** 3D simulator, satisfaction, self-confidence, virtual simulation

## Introduction

Technology continues to experience developments affecting various aspects of life, including health and education. Technological developments in nursing and education can be collaborated effectively to improve the quality of nursing care (Padilha et al., 2019). The use of technology in collaboration can be applied to start from the learning process, one of which is in laboratory practice activities. Many laboratory practice activities in nursing education use simulations. Simulation-based learning combines practical skills with theory so that students can master various skills needed in the nursing profession (Koukourikos et al., 2021; Wardani et al., 2019) Simulation-based learning can help students to achieve psychomotor, cognitive and affective skills that will be used in clinical situations (Brown et al., 2022; Holilah & Pohan, 2018).

Many simulation activities in nursing education are done face-to-face. However, face-to-face simulation requires a lot of resources, such as space, time, and cost (Shin et al., 2019). The existence of these barriers encourages educators to look for new technologies that can provide realistic learning opportunities, can be used at any time and can be an alternative to distance learning, such as the use of virtual simulations (Brown et al., 2022; Shin et al., 2019) using 3D simulators.

Virtual simulation is a term that can refer to virtual reality, game-based learning, 3D simulators and others (Foronda, 2021). Virtual simulation is the utilization of immersive technology in digital learning environments (e.g. computers, tablets and mobile phones) to foster a more realistic/live learning experience in accordance with the target learning outcomes (Foronda, 2021). 3D simulators are a form of immersive technology that enables realistic learning experiences that resemble real clinical conditions through simulation (Martínez et al., 2019). 3D simulators are innovative web-based learning media designed to stimulate learners' critical thinking. Virtual simulations such as 3D simulators can allow students to engage in real clinical scenarios with patients in an interactive platform (Hudder et al., 2021; Turrise et al., 2020). The use of 3D simulators can be one of the alternatives to limited laboratory practice, where 3D simulators provide the opportunity to practice the same scenario repeatedly and can display results and feedback in real-time (Cobbett & Snelgrove-Clarke, 2016; Hudder et al., 2021).

The effectiveness and quality of 3D simulators as one of the e-learning learning media can be assessed through satisfaction and learning outcomes (Sampson et al., 2010). Kotler and Keller (2015) in Basith et al. (2020) stated that satisfaction is a feeling of pleasure or disappointment resulting from comparing perceptions and experiences felt with expectations. Satisfaction can affect academic achievement. High satisfaction can improve student academic achievement, and low satisfaction can lead to poor academic performance (Basith et al., 2020; Putra, 2019).

In addition to satisfaction, self-confidence is an important part of the learning process. In clinical education, self-confidence is a student's belief in their knowledge and practical skills in nursing care (Swift et al., 2022). Self-confidence can significantly affect the quality of one's actions and behaviour which is one of the keys to clinical competence (Kordi et al., 2015). Nurses need self-confidence in carrying out their duties, including conducting assessments and interventions and working in teams (Omer, 2016) to provide safe and error-free care (Alharbi & Alharbi, 2022). Lack of self-confidence in students, especially in clinical nursing students, can cause a decrease in the quality of service and make students afraid to provide nursing care, so the quality of nursing care decreases (Huriani et al., 2022). Lack of self-confidence can result in a lack of student skills because they are afraid to provide nursing care (Huriani et al., 2022).
Previous studies have shown that the use of 3D simulators can increase satisfaction and self-confidence (Padilha et al., 2019; Turrise et al., 2020; Widiasih et al., 2022), increase knowledge and self-efficacy (Forsberg et al., 2016; Goldsworthy et al., 2022), helping to reduce anxiety, prioritize and promote self-directed learning (Goldsworthy et al., 2022).
Research on satisfaction and self-confidence in using 3D simulators has been widely

conducted in developed countries. Still, researchers have not found many developing countries, including Indonesia using 3D simulators in health education, especially nursing education. In previous studies, the use of 3D simulators focused on one action and did not provide opportunities for students to try various content contained in 3D simulators. Based on this phenomenon, researchers are interested in identifying the satisfaction and self-confidence of nursing students in learning using 3D simulators.

## Research Method

This research is a quantitative descriptive study conducted in December 2022. The population in this study were students of the Faculty of Nursing in a public University, class of 2019, totalling 159 students. The sample calculation was carried out using the Slovin formula with a 10% error tolerance percentage, and a sample of 61 students was obtained. To anticipate the drop out rate, the researcher added 10% of the total minimum sample so that 67 students were obtained as a research sample. All samples are nursing students selected using the purposive sampling technique, which means that the sample is determined by determining criteria, including active students of the Faculty of Nursing class of 2019 who have completed Medical-Surgical Nursing (KMB), Pediatric Nursing, Maternity Nursing and Emergency and Disaster Nursing courses, as well as active nursing students who are willing to participate in the study.

Data was collected using the Student Satisfaction and Self-Confidence in Learning Scale (SCSL) questionnaire developed by The National League for Nursing (NLN) and translated into Bahasa Indonesia. The research team discussed and finalised the instrument. This questionnaire contains 13 question items consisting of 5 questions regarding satisfaction and 8 questions regarding self-confidence. Each question has 5 answer options with each value, namely strongly disagree (1), disagree (2), undecided (3), agree (4), and strongly agree (5). The validity test found that all question items were valid with r = > 0.361. In the reliability test, the Cronbach Alpha value for the satisfaction question items ranged from 0.718 to 0.753, while the Cronbach Alpha value for the self-confidence question items ranged from 0.807 to 0.885 (Widiasih et al., 2022). The category of the satisfaction included Very Dissatisfied, Dissatisfied, Quite satisfied, Satisfied, and Very Satisfied.

In this study, 67 students tried learning using the 3D simulator VNursLab (Virtual Nursing Skills Simulation Lab), which has 12 reading materials and nursing actions. At the time of the study, students were free to choose the materials and nursing actions to be studied according to their wishes. After completing the learning, students will fill out a satisfaction and self-confidence questionnaire in the form of an online questionnaire.

To answer the research questions, all data collected were then analyzed and described in frequency, percentage, mean and standard deviation. All data were analyzed using SPSS software version 26.

The ethical principles used in this study include respect for others, respect for privacy and confidentiality, respect for beneficence and maleficence and respect for justice and inclusiveness. This research has received approval and ethical consideration from Universitas Padjadjaran , with number 1005/UN6.KEP/EC/2022.

## Result

**Table. 1 Demographic Characteristics of Respondents (n=67)**

| Demographic Data | Results | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 3 | 4.5% |
| | Female | 64 | 95.5% |
| Age | 20 | 5 | 7.5% |
| | 21 | 45 | 67.2% |
| | 22 | 16 | 23.9% |
| | 23 | 1 | 1.5% |
| Campus Area | Jatinangor | 46 | 68.7% |
| | Pangandaran | 21 | 31.3% |
| Experience using a 3D simulator | Yes | 47 | 70.1% |
| | No | 20 | 29.9% |

Table 1 shows that almost all respondents were female (95.5%). The respondents' age range is 20-23 years, and most respondents are 21 years old (67.2%). Based on the campus administrative area, most respondents came from Jatinangor (68.7%). Most respondents have used 3D simulators (70.1%), and some (29.9%) have never used 3D simulators.

**Table 2 Frequency distribution of student satisfaction level (n=67)**

| Category | Mean | Frequency | Percentage |
|---|---|---|---|
| Very Dissatisfied | 1 - 1.79 | 0 | 0% |
| Dissatisfied | 1.8 - 2.59 | 0 | 0% |
| Quite satisfied | 2.6 - 3.39 | 0 | 0% |
| Satisfied | 3.4 - 4.19 | 23 | 34.3% |
| Very Satisfied | 4.2 - 5 | 44 | 65.7% |

Based on table 2, most students (65.7%) are in the very satisfied category, while others (34.3%) are in the satisfied category on learning using a 3D simulator.

**Table 3 Frequency distribution of students' self-confidence level (n=67)**

| Category | Mean | Frequency | Percentage |
|---|---|---|---|
| Very Unconfident | 1 - 1.79 | 0 | 0% |
| Unconfident | 1.8 - 2.59 | 0 | 0% |
| Confident Enough | 2.6 - 3.39 | 1 | 1.5% |
| Confident | 3.4 - 4.19 | 27 | 40.3% |
| Very Confident | 4.2 - 5 | 39 | 58.2% |

Based on table 3, most students (58.2%) are in the very confident category, almost half of the students (40.3%) are in the confident category, and a small number of students (1.5%) are in the moderately confident category in learning using a 3D simulator.

**Table. 4 Students' level of satisfaction and self-confidence using the 3D simulator (n=67)**

| Items | Mean | Std. Deviation | Interpretation |
|---|---|---|---|
| Satisfaction level | 4.415 | 0.489 | Very satisfied |
| Self-confidence level | 4.338 | 0.419 | Very confident |

**Categorization: Very dissatisfied/unconfident (1.0 - 1.79); dissatisfied/unconfident (1.8 - 2.59); moderately satisfied/ moderately confident (2.6 - 3.39); satisfied/confident (3.4 - 4.19); very satisfied/confident (4.2 - 5.0). (Aldhafeeri & Alosaimi, 2020)**

Table 4 shows that students are very satisfied (M = 4.415; SD = 0.489) and very confident (M = 4.338; SD = 0.419) in learning using a 3D simulator.

## Discussion

The level of student satisfaction in this study shows the mean of satisfaction is 4.415. This can be interpreted that students are very satisfied with learning using a 3D simulator. This is in line with research by Widiasih et al. (2022), which showed a significant difference in satisfaction in the control and intervention groups. This is because the VNursLab 3D simulator provides a different learning experience from conventional learning. The new experience gained by using a 3D simulator as a learning media can significantly increase learning satisfaction. In addition, the VNursLab 3D simulator is easy to access using various electronic devices connected to the internet. It has been adapted to Indonesian culture and uses the Indonesian language to make it easier for students to understand (Widiasih et al., 2022).

However, this is inversely proportional to the research conducted by Hudder et al. (2021), and Cobbett and Snelgrove-Clarke (2016), where students who use 3D simulators have lower satisfaction than students who complete lab-based learning activities. This is related to technical issues such as unstable networks that cause the 3D simulator to be slow/loading when used, and students are not familiar with the features contained in the 3D simulator (Cobbett & Snelgrove-Clarke, 2016). In addition, the existence of student preferences in the implementation of face-to-face laboratories such as getting immediate feedback, cognitive skills and psychomotor skills can be well integrated and collaborative knowledge exchange with other learners causes students to have lower satisfaction scores on the use of 3D simulators (Hudder et al., 2021).

However, it is different from the implementation of this study, where before learning using a 3D simulator, students get an explanation first about the features, materials, nursing actions and stages contained in the VNursLab 3D simulator. Then, students are also sent an explanation in the form of a document, and they can review the explanation of the 3D simulator so they can understand how to use the 3D simulator and make simulation work easier.

The level of student self-confidence in this study shows the mean of confidence is 4.338. This shows that students are very confident when learning using a 3D simulator. This is supported by research Turrise et al. (2020) and Widiasih et al. (2022), which showed that the intervention group using the 3D simulator had higher self-confidence than the control group. 3D simulators allow users to practice the same scenario or repeatedly feature according to student needs and can display immediate feedback (Cobbett & Snelgrove-Clarke, 2016; Hudder et al., 2021; Widiasih et al., 2022). This repetition can improve students' readiness before taking action (Widiasih et al., 2022). In addition, students with good preparation, easy access and a realistic learning experience on the simulator can increase student self-confidence (Kerr et al., 2020). Self-confidence also increases because it can be evaluated repeatedly through quizzes, case studies, simulation with three-dimensional technology and self-reflection (Kim et al., 2021).

High satisfaction and self-confidence in this study can occur because students have received material and performed nursing actions contained in the 3D simulator through conventional online and offline learning. So that students have good preparation when using 3D simulators.

3D simulators can provide solutions to the obstacles of face-to-face laboratory implementation. The 3D simulator uses virtual patients that offer new experiences for students. Student satisfaction and confidence in learning can increase because of the opportunity to repeatedly try the various stages of the 3D simulator, such as reading material, p retest, case study, nursing care plan analysis, 3D simulation of nursing actions, posttest and self-evaluation so that

the 3D simulator can be a medium to support learning in several courses contained in the Faculty of Nursing.

## Conclusion

Satisfaction and self-confidence are very important for nursing students because they will affect learning outcomes and can further affect the quality of nursing care. This study shows that students are very satisfied and very confident in learning using 3D simulators. 3D simulators can be a medium to support learning in nursing education that can be accessed flexibly and can improve students' skills and knowledge. 3D simulators can be used in several courses that hold simulation activities both before and after simulation activities. So that students can prepare for practicum properly and review material about actions that have been taken through the 3D simulator.

There are several limitations in this study, including using a small number of samples because there are limitations in recruiting respondents. This research was conducted online so that it could not anticipate obstacles originating from the devices used by respondents. In its implementation, only 12 students could try the VNursLab 3D simulator simultaneously due to account limitations, so this research was divided into several clusters. The VNursLab 3D simulator takes quite a long time when moving from one stage to another, reduces processing time, and is widely complained about by respondents. Further research is needed regarding factors that can affect satisfaction and confidence in using 3D simulators.

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