

The Impact Of Using 3D Simulator On Learning Motivation Of Nursing Students

Atiq Rizka Azjunia, Maria Komariah, Setiawan
Faculty of Nursing, Universitas Padjadjaran
Email: atiq19001@mail.unpad.ac.id

Abstract

In the development of the world of technology and information, technological innovations continue to be promoted by humans to this day, one of the innovation is 3D technology. This interactive 3D simulator learning media, it is felt that it will further motivate students in learning, without motivation it is very possible if students are lacking in learning. To find out whether the use of 3D simulators has an impact on learning motivation of Padjadjaran University Nursing students. This research applied quantitative research, with pre-experimental and using One-Group Pretest-Posttest. The sample in this study amounted to 54 respondents, with the sampling technique purposive sampling. The instrument used is the Academic Motivation Scale (AMS). Then, analyzed univariate and bivariate using SPSS application version 25 for windows. Results: The p value indicated a significant difference between the pretest and posttest groups with $p=0.03$ ($p<0.05$). The use of 3D simulators as learning media can increase nursing students' learning motivation. So, we suggest that this research can be considered by tertiary institutions as a medium to support teaching and learning processes.

Keywords: 3D simulator, learning motivation, students

Introduction

Currently, the world is entering the era of the industrial revolution 4.0, which demands that everything be reached with technology. Information technology has also become a basis in human life. Technological developments that can be seen easily are smartphones and the internet. Today's technology can affect various aspects of life such as communication, work, fulfilling needs, and even learning. This happened as an effort to achieve the industry revolution 4.0 targets, namely the internet of things, artificial intelligence, robotic and sensor technology, human machine interfaces, and 3D technology (Disdik, 2019).

In the development of the world of technology and information, technological innovations continue to be promoted by humans to this day, one of which is 3D technology. 3D technology is the right choice because in its application 3D technology can make a real object visualized into a graphic object (Hadi, 2021). 3D technology itself is one of the most promising technologies today. 3D technology can be used in various scientific fields, ranging from astronomy, biochemistry, images, and even used in the health sector (Alhonkoski et al., 2021).

The Faculty of Nursing, Universitas Padjadjaran has created a web-based innovation designed to teach, stimulate and develop students' critical thinking. The guiding principle is that innovation uses case studies, easily accessible, and set in Indonesian culture. The innovation is titled Virtual Nursing Skills Simulation Lab (VNursLab) using 3D technology. The creation of VnursLab was the Covid-19 pandemic which changed the learning method to online. This innovation is a learning media online that are able to facilitate nursing action skills (Widiasih et al., 2022).

Interactive 3D simulator Vnurslab is a web-based nursing action designed to be an alternative learning medium for nursing students to achieve their competence. According to research conducted by Widiasih et al., (2022) this 3D interactive Vnurslab is effective as a learning media. However, combining digital patient-based learning methods and hands-on learning with patients

will also help nursing students become more competent in carrying out their nursing practice. In principle, every student certainly has the right to have the opportunity to achieve satisfactory learning outcomes, both knowledge and skills. However, in reality it seems clear that every student has differences in the learning process. Therefore, in this case, students need motivation (encouragement) in learning.

In the learning process student learning motivation can affect the quality of achievement of learning outcomes, if in carrying out the learning process students do not have motivation, then these students will not be enthusiastic about learning and will certainly have a negative influence on learning outcomes (Sardiman, 2018). Based on research conducted by Shafira (2020) that the learning motivation of students of the Faculty of Nursing, Padjadjaran University in online learning is relatively low. The aim of this study is to find out whether the use of 3D simulators has an impact on learning motivation of Padjadjaran University Nursing students. Supported by the absence of research that discusses the use of interactive 3D simulators on the learning motivation of Nursing students at Universitas Padjadjaran.

Research Method

The type of research used in this research is quantitative research, using a pre-experimental design with One-Group Pretest-Posttest. Because there are external variables that influence the formation of the dependent variable, and there are also no control variables, and the samples used are not randomly selected (Sugiyono, 2018). The population in this study were 125 students of the Faculty of Nursing, Universitas Padjadjaran, class of 2019. The sampling technique is Non-Probability Sampling with Purposive Sampling. The number of samples in this study were 54 students. This amount is obtained from the calculation by entering the effect size 0.5, α err prob 0.05, power 0.95. This calculation uses G-Power Statistics Application 3.1.9.4.

In the process of research, to anticipate dropping out, the researcher added 10% of the total sample, namely 6 people. So the

total sample is 60 respondents. The inclusion criteria used were active students of the Faculty of Nursing, Universitas Padjadjaran class of 2019, and students who had passed Pediatric Nursing, KMB (Medical Surgical Nursing), Maternity, Emergency Nursing and Critical Nursing courses. While the exclusion criteria were students who were not willing to fill out the questionnaire and students who took leave. Then, those included in the drop out criteria were students who withdrew, students who did not fill out the questionnaire completely, and did not participate in the research process until it was finished.

The instruments used in this research are Academic Motivation Scale (AMS). AMS was designed by Vallerand et al., (1992) to measure academic motivation. The AMS instrument was later adapted by Natalya (2018) to become the Academic Motivation Scale: Short Indonesian Language Version. Instrument Academic Motivation Scale (AMS) has been translated into Indonesian. This AMS instrument has 15 questions using a Likert scale, namely by providing six answer choices starting with "1" (Strongly Disagree), "2" (Disagree), "3" (Somewhat Disagree), "4" (Somewhat Agree), "5" (Agree), and "6" (Strongly Agree). The Academic Motivation Scale instrument adapted by Natalya (2018) has been tested for validity and reliability with a value of $r = 0.321$. And the value of Cronbach's Alpha 0.695-0.860. Therefore, the Academic Motivation Scale instrument is a valid and reliable measurement tool so that it can be used to measure academic motivation accurately and reliably.

The data analysis used was univariate and bivariate analysis. Univariate analysis was used in the form of frequency and percentage distributions to describe the characteristics of the sample. While bivariate analysis is used to see and determine the pretest and posttest values of the variables studied. The normality test was carried out as a prerequisite test to determine the distribution of data using the Kolmogorov-Smirnov, because the sample in this study was more than 50 respondents. After the prerequisite test was carried out, it was found that the learning motivation variable data was not normally distributed with a Sig value. 0.39 (<0.5), so the Wilcoxon

Signed Rating Test was used. Data analysis was performed using the SPSS application version 25 for Windows. When entering data into the SPSS application, no missing data was found.

This research has received ethical approval from the Research Ethics Commission of Universitas Padjadjaran, Bandung with an ethical letter number 1005/UN6. KEP/EC/2022. Researchers gave consent forms to respondents without coercion to participate. Then the researcher maintains the privacy of the respondents during the data collection process. The researcher gave the same treatment to all respondents without discriminating against anything, and this research did not harm the respondents either physically or mentally.

The data collection procedure was carried out online for six days starting from Friday, December 23, 2022 to Wednesday, December 28, 2022. On the first day, the researchers distributed informed consent through the Google form to request respondents' consent. If the respondent agrees, the respondent immediately enters the WhatsApp Group via the link provided. After all the respondents entered the Whatsapp Group, then the researcher gave a pretest of learning motivation to the respondents. After that, the respondents were divided into two groups. The first group consisted of 30 people, and the second group consisted of 30 people. The first 30 people use the 3D simulator on Friday and Monday, and the second 30 people use the 3D simulator on Tuesday and Thursday.

In the process of the research, each respondent gets two times the use of the 3D simulator with alternating times. When using the 3D simulator there are several stages in it, namely when you start accessing the 3D simulator link (www.vnurslab.com) on the initial display, the user must log in by entering the username and password provided by the researcher. Then the respondent chooses the case to be studied. In this study the use of the first 3D simulator was given cases of ACS (Acute Coronary Syndrome) with BHD (Basic Life Support) nursing actions and the second 3D simulator was given DHF (Dengue Hemorrhagic Fever) cases with infusion nursing actions. Then the respondents did a pretest according to the case. After carrying

out the pretest according to the case, there is also a case analysis that must be carried out by the user. After that, the user is given a case and immediately takes nursing action. After that, a posttest related to the case was given and finally self-reflection. All of these stages are still in one series using a 3D simulator. The time to use this 3D simulator is approximately 60 minutes.

After all the respondents used the 3D simulator twice, they were given a posttest on the respondents' learning motivation. During the data collection process, it is the researcher's responsibility to follow up on respondents who do not follow proper procedures. Apart from that, the way researchers access samples is through zoom meetings and WhatsApp Groups as a communication tool, after using the 3D

simulator, each respondent provided evidence to the researcher in the form of a screenshot of the 3D simulator. During the research process, respondents only complained about the signal being intermittent. However, this was only temporary and did not become an obstacle in the research process. This research has been carried out according to the procedure.

Results

Respondents who were included in this study according to the criteria were 60 respondents. All respondents took part in the study to the end and none fell into the drop out criteria. So that data from 60 respondents can be analyzed using univariate and bivariate analysis.

Table 1. Demographic Data Characteristics (n = 60)

| Demographic Data | Frequency (F) | Percentage (%) |
|--------------------------------------|---------------|----------------|
| Gender | | |
| Boy | 2 | 3.3 % |
| Woman | 58 | 96.7 % |
| Age | | |
| < 20 years | 0 | 0 |
| 18-20 years | 2 | 3.3 % |
| > 20 years | 58 | 96.7 % |
| Experience Using 3D Simulator | | |
| Yes | 13 | 21.7 % |
| No | 47 | 78.3 % |

Based on Table 1 as many as 60 students were given interventions using interactive 3D simulators as learning media. The majority of respondents were women (96.7%), and 96.7% were >20 years old. Based on experience using 3D interactive simulators, it is known that 78.3% of nursing students class of 2019 have never used 3D interactive simulators.

Table 2. Impact of using 3D Simulator on Student Learning Motivation (n = 60)

| Variabel | | Minimum | Maximum | Mean | SD | p-value |
|----------------------------|----------|---------|---------|-------|-------|---------|
| Learning Motivation | Pretest | 49 | 83 | 67.85 | 6.002 | 0.003 |
| | Posttest | 61 | 90 | 71.13 | 6.277 | |

On Table 2 it can be seen that there is an increase in the average pretest-posttest score on the learning motivation variable (67.85 - 71.13). Then the p value is the result of a bivariate test, namely the Wilcoxon Signed Rank Test which shows a significant difference between the pretest and posttest groups with a value of $p = 0.03$ ($p < 0.05$).

Discussion

The findings in this study indicate that there is an increase in the posttest score of learning motivation, and also shows a significant difference between the pretest and posttest on learning motivation. Motivation is a series of efforts to make someone want and want to do something, and if they don't like it, they will try to eliminate that feeling of dislike (Emda, 2017). Motivation is very necessary in learning, learning outcomes will be optimal if there is motivation, motivation will always determine the intensity of learning effort for students (Mendari & Kewal, 2016). Whether or not a person is active in learning is influenced by various factors, one of which is motivational factors. Someone who is motivated to learn indirectly has goals or aspirations that must be realized (Palittin et al., 2019). The use of teaching and learning tools in the field of nursing using 3D simulators can replace an original action into a three-dimensional visual form. This can attract the attention of students and lead to the competencies to be achieved, as well as additional sounds and images that are close to the actual situation encouraging students to be more serious and have high motivation in carrying out the learning process (Soleh, 2019).

3D technology in the field of nursing allows students to do more experiments, and thus students can collect more information in the same amount of time needed to do practicum without having to go to the laboratory (Alhonkoski et al., 2021). Virtual laboratory learning media can be used as a tool to be carried out at home and even wherever students are. So that the student learning process can grow not only when students are on campus either in class or in the laboratory (Muchlas, 2014). Increasing student motivation to learn can make these students active in learning materials to support the learning process.

This study indicate that there is an increase in the posttest score of learning motivation, and also shows a significant difference between the pretest and posttest on learning motivation. The results of this study are in line with research conducted by Sari et al., (2019) which showed an increase in posttest

scores after being given learning media using 3D technology. The findings of this study also show that the use of 3D simulators can increase student learning motivation. Because this 3D simulator is presented in high-quality resolution, there are additional images and sounds that can be accessed via a PC, laptop or smartphone. Thus, it can increase motivation to learn during the learning process takes place. This is in line with research conducted by Sung et al., (2018) which showed that students who learned to use a 3D technology learning media system showed better learning achievement, problem-solving tendencies, in-depth learning strategies, and learning motivation than students. who studied with conventional learning approaches.

The use of 3D simulator media as a learning medium makes new learning experiences for students fun and not monotonous. Thus it can improve the skills of nursing students related to their nursing practice. Previous research stated that in the health sector, 3D technology can be used as a means of supporting students in learning, especially as a medium for virtual practicum learning (Mikkonen et al., 2018). Using virtual practicum learning media will reduce the obstacles experienced by students such as practicum tools and materials which are quite expensive, and students are less comfortable doing practicums for fear that the tools used will be damaged (Muchlas, 2014).

This study has advantages, namely the appropriate research design to focus on measuring the effect of the independent variable on the dependent variable and the exciting effects of using a 3D simulator. The limitations of this study are that the research process was carried out online, and the samples were not randomly selected. The Internet connection is also one of the burdens faced in the research process; it may also become a challenge for rural students.

Conclusion

Based on the description above, the posttest score of learning motivation is higher than the pretest score after being given a 3D simulator, and the value of $p = 0.003$ ($p < 0.05$) which means H_0 is rejected. It can be concluded that the use of learning media

using a 3D interactive simulator can increase the learning motivation of nursing students. The use of learning media that follows technological developments in the learning process can stimulate students to increase learning motivation. The use of this interactive 3D simulator as a learning medium can be a promising new approach in increasing nursing student learning motivation. The results of this research are expected to be input for tertiary institutions to consider 3D simulators as supporting media for teaching and learning processes, and this research is expected to become initial data for the development of further research, especially regarding 3D simulator technology. Suggestions for further research are research using 3D simulators to be carried out offline and also using different populations so that researchers can monitor them clearly.

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