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**The Influence of Assemblr Edu to Improve Knowledge of Parenteral Medication Among Nursing Students in Yogyakarta Nursing College, Indonesia**Istichomah^{1,2}, Tukimin Bin Sansuwito²¹ Profesi Ners, STIKes Yogyakarta, Indonesia² Doctoral Program, Nursing Faculty, Lincoln University College, Malaysia**Abstract**

Parenteral medication administration errors among nursing students are most common in nursing laboratories and health services. This will be dangerous for patients as well as for students. Efforts to improve students' knowledge and skills continue to be developed by nursing education in Indonesia. One form of educational media development is Assemblr edu. By using Assemblr edu about parenteral medication, it is hoped that students can access easily and quickly. The research is a quasi-experimental study with a non-equivalent group pre-test and post-test designed with control group. This research to examine the effectivities of Assemblr edu parenteral medication on knowledge and skill among nurse student. In a two-group experiment using pretest-posttest methodology with an added comparison group, the intervention group in the first group received Assemblr edu while the control group get manual modul of parenteral medication. The research location at three nursing College in Yogyakarta. Respondents in this study in each group were 56, so the total respondents were 112 students. Statistic test shows that the Sig. (2-Tailed) value from the Independent Sample t-test as 0.000 or <0.05 , indicating a difference in the mean scores between the post-test measurements of knowledge and skills in the control and experimental groups. Based on this Sig. (2-Tailed) value, it can be interpreted that there is a significant relationship regarding the effectiveness of Assemblr Edu Augmented Reality in improving the knowledge and skills of parenteral medication among nursing students at Yogyakarta Nursing College, Indonesia. There was a difference in the pre-post test scores related to knowledge in administering medication via parenteral routes between the control and intervention groups.

Keywords: assemblr edu, parenteral medication, knowledge, skill

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1. Introduction

Appropriate patient medication administration one of the nursing student competencies that must be mastered. Lack of experience and clinical skill possessed by students can be the reason student feel dissatisfied with their clinical experience. In certain cases, students are reported to have feeling of inferiority due to feeling arising due to the weakness or lack of knowledge possessed by the students laboratory experiences. When students' clinical learning experience is not as expected, then learning innovation is needed as an alternative to provide opportunities for students to master basic nursing skills and other specific nursing skill [1].

There are previous research has found that the knowledge about right drug administration in nursing students is still low. Study from [2], Bandung, West Java, Indonesia found that low knowledge about drug administration is 21,57%. Another study from [3] found that intra cutan injection Another study also mentioned that IC injection is the second least mastered prerequisite after wound care (13,88%). A study form Purwokerto, Central of Java, Indonesia also found that Injection technique expertise is typically lacking among nursing students [4]. A Jordanian study also found that injection technique skills are usually lacking among nursing students [5]. A study from Oman found that the incidence of needlestick injuries was higher among nurses who had low knowledge of needlestick injury prevention and who had not received relevant training during their undergraduate education [4]. A study from Iraq found that nursing student Knowledge about intramuscular injection is moderate, and need to provide e-learning programs trough develop their knowledge experiences as well as their practical skills through continuous training courses in hospitals and nursing laboratories [6].

Assemblr Edu is a platform that gives educators and students create, explore, and share augmented reality (AR) experiences. It is intended to make AR creation accessible





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and entertaining for educational purposes. Assemblr Edu offers a simple interface for generating augmented reality content that does not require substantial technical knowledge. Users can create dynamic 3D models, animations, and scenarios from a collection of pre-made components or import their own. Educators can use these materials to properly integrate augmented reality into their teaching. Assemblr Edu facilitates cooperation between students and instructors, allowing them to work on AR projects in real time. Users can also share their works with the larger Assemblr community, which promotes innovation and inspiration. Assemblr Edu is compatible with a variety of devices and platforms, including smartphones, tablets, and augmented reality glasses [7].

The interventions to increase passing grade have been carried out by the head of the study program. Learning for 100 minutes in theory and 170 minutes in laboratory skills has been carried out by the basic nursing department [8]. Students who do not pass are required to take enrichment and remedial exams. However, students who have taken remedials still have low scores. For this reason, more extra effort is needed so that students who have not passed can administer drugs properly and correctly.

Based on the problems above, the gap and the previous research to overcome the elevation of error medication, so the researcher will do education intervention to overcome the problem. Education intervention based on assemblr edu will apply in this intervention, so the nurse student can access easier and cheaper.

2. Research Method

The research is a quasi-experimental study with a non-equivalent group pre-test and post-test designed with control group. This study conducted at three of nursing College in Distric Yogyakarta, Java, Indonesia. the sampling is as nursing students. Students chosen for recruitment from a list of senior student eight semester, using simple random sampling selection approach are 116 students. Inclusion criteria were students who are currently in the eight semester of the bachelor of nursing program, age from 18- 25 years old, an active student, and who have low scores (under 75%) or do not pass during the pre-clinical exam which is a requirement in continuing the nursing profession stage. these students have also been given remedial and additional material. This research lasted for one month in each college, from July to September 2024.





3. Results and Discussions

a. Result

Table 1
Demographics Profile of The Respondents Based on Gender

No	Characteristics Gender	Experiment Group N : 58		Control Group N : 58	
		Frecuency	Percentage (%)	Frecuency	Percentage (%)
1	Men	9	15,5%	9	15,5%
2	Women	49	84,5%	49	84,5%
	Total	58	100%	58	100%

Source : Primary Data, 2024

Total Respondent : $n1+n2$: 116

Based on the research findings in Table .1, it is shown that the gender distribution between the experimental group and the control group is comparable and has the same percentage. Specifically, the majority of the participants are female, with 49 students or (84.5%), while the remaining participants are male, with 9 students or (15.5%).

Table 2.
Demographics Profile of The Respondents Based on Age

No	Characteristics Age	Experiment Group N : 58		Control Group N : 58	
		Frecuency	Percentage (%)	Frecuency	Percentage (%)
1	20 th	2	3,4%	1	1,7%
2	21 th	6	10,3%	5	8,6%
3	22 th	37	63,8%	42	72,4%
4	23 th	13	22,4%	10	17,2%
	Total	58	100%	58	100%

Source : Primary Data, 2024

Total Respondent : $n1+n2$: 116

Based on the research findings in Table. 2, it was found that all students, from both the experimental and control groups, were in their twenties. The majority age in the experimental group is 22 years old, with 37 students or (63.8%), while the minority age is 20 years old, with 2 students or (3.4%). In the control group, the majority age is also 22 years old, with 42 students or (72.4%), while the minority age is 20 years old, with 1 student or (1.7%).





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Table 3.
Demographics Profile of The Respondents Based on GPA score

No	GPA score	Experiment Group N : 58		Control Group N : 58	
		Frecuency	Percentage (%)	Frecuency	Percentage (%)
1	< 3	4	6,9%	11	19%
2	> 3	54	93,1%	47	81%
Total		58	100%	58	100%

Source : Primary Data, 2024

Total Respondent : $n1+n2$: 116

Based on the research findings presented in Table 4.3, it shows that the majority of the GPA scores in the experimental group are >3, with 54 students or (93.1%), while the majority of GPA scores in the control group are represented by 47 students or (81%)

Table 4.
Central Tendency of Pre-Post Test Knowledge

No	Characteristics	Experiment Group N : 58		Control Group N : 58	
		Mean	SD	Mean	SD
1	Pre Test Knowledge	15,67	2,237	15,17	2,968
2	Post Test Knowledge	28,29	1,654	18,98	3,343

Source : Primary Data, 2024

Total Respondent : $n1+n2$: 116

From the research findings in Table 4, it was discovered that the mean and standard deviation for the experimental group's pre-test knowledge were 15.67 and 2.237, respectively, while the post-test knowledge mean and standard deviation were 28.29 and 1.654. Meanwhile, the control group had a mean and standard deviation of 15.17 and 2.968 for the pre-test knowledge, and the post-test knowledge mean and standard deviation were 18.98 and 3.343.

Table 5.
Paired Sample t-test

Characteristics		Paired Sample t-test	
		Experiment Group N : 58	Control Group N : 58
		Sig. (2-Tailed)	Sig. (2-Tailed)
Knowledge	Pre-Test	.000	.000





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Post-Test

.000

.000

*Source : Primary Data, 2024**Total Respondent : n1+n2 : 116*

Table 4.8 shows the Sig. (2-Tailed) value of the Paired Sample t-test as 0.000 or <0.05 , indicating that the mean scores pre- and post-test measurements of knowledge in the control and experimental groups. Therefore, based on the Sig. (2-Tailed) value, it can be interpreted that there is a significant relationship regarding the effectiveness of Assembler Edu Augmented Reality in improving the knowledge of parenteral medication among nursing students at Yogyakarta Nursing College, Indonesia. The findings of research conducted on health school students in Yogyakarta show that there is a significant difference between the control group and the intervention group through the use of Assembler Edu for parenteral drug administration. This is due to the intervention provided using the Assembler Edu method for parenteral drug administration in the experimental group, which provided sufficient information to one of the groups. Through the pre and post-test assessments given to nursing students in Yogyakarta, the researchers were able to precisely determine and gain a clear understanding of the results obtained.

The research found that the pre-test scores in the control group, based on the mean and standard deviation (SD), were 15.17 and 2.968, respectively. Meanwhile, the post-test scores in the experimental group, based on the mean and standard deviation (SD), were 15.67 and 2.237. At first glance, the post-test score difference between the control and experimental groups was not significantly large, with the experimental group scoring 0.50 points higher than the control group.

The study also uncovered a new fact: the post-test scores of the control group, based on the mean and standard deviation (SD), were 18.98 and 3.343, respectively. Meanwhile, the post-test scores in the experimental group, based on the mean and standard deviation (SD), were 28.29 and 1.654. From these results, it can be concluded that there is a substantial gap in scores between the two groups. The difference in the average post-test scores between the control and experimental groups is 9.31 points.

The difference in post-test scores after the Assembler Edu intervention for administering parenteral medication between the control group and the experimental group





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indicates that the Assembler Edu platform is quite effective in enhancing the knowledge of nursing students. Assembler Edu provides a simple interface for creating augmented reality content without requiring deep technical expertise. Users can create 3D models, animations, and dynamic scenarios from a set of available components or import their own. Educators can use this material to more effectively integrate augmented reality into their teaching. [7].

Nursing students are required to have a fundamental knowledge of nursing procedures performed on patients, one of which is parenteral medication administration. This knowledge is essential because the administration of parenteral medications is widely used in practice at hospitals, clinics, and health centers. Parenteral medication plays a crucial role in the patient's healing process. Many experts have explained it through research, which has been documented by well-known figures, Potter and Perry, in their book that outlines the route of medication administration as the way medicine enters the body. Parenteral medication refers to medicine administered through methods other than the digestive tract. Medications administered parenterally are directly delivered into the body's tissues and circulatory system [9].

If a nursing student has a good level of knowledge regarding nursing actions, their application in real-world situations will improve. The Assembler Edu learning platform offers significant advantages in enhancing students' experience in acquiring knowledge from information. Therefore, the author theorizes that the extensive use of the Assembler Edu learning method among students will result in an increased level of knowledge.

The levels of human knowledge are generally divided into four, which are "knowing." Knowing refers to the ability to recall information that has been previously learned, making it the most basic level of knowledge. It involves recognizing, stating, explaining, and defining material. This level also includes recalling specific details or responding to stimuli that relate to what has been learned [10].

The second level is "comprehension." Comprehension is the ability to connect and interpret a known object or concept in relation to well-understood material. Individuals with this ability should be able to explain, provide examples, draw conclusions, predict outcomes, and discuss the subject at hand [11]. The third level is "application." Application





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is the skill of using acquired knowledge in practical situations. This involves applying rules, formulas, methods, or concepts in specific contexts [12] The fourth level is "analysis." Analysis is the capacity to break down and explain something within its organizational structure while maintaining its relationship to other elements. Analytical skills can be demonstrated by verbs like describing [13]. The fifth level is "synthesis." Synthesis refers to the ability to combine or link elements to form something new. It involves integrating new ideas or formulas into existing frameworks, such as planning, organizing, summarizing, or enhancing others' concepts [14]. The final level is "evaluation." Evaluation involves the ability to assess or eliminate certain materials or objects based on their relevance or accuracy. Through the division of these knowledge levels, researchers assume that the level of knowledge achieved pertains to the application of knowledge obtained in the field. To assess the students' ability at the application level of the knowledge acquired regarding parenteral drug administration, further evaluation/research is necessary.

4. Conclusion

These findings suggest that in the future, the assembly-based learning approach will be the go-to option for maximizing students' information acquisition. Furthermore, because of its effectiveness and practicality, the experts highly advise that this approach be regularly applied in all learning processes.

5. Compliance with ethical standards

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Disclosure of conflict of interest

For all researchers, this study collaboration is beneficial since it eliminates disagreements, issues, and other problems for all writers.

Statement of informed consent

As creators, we all accept or consent to anything we do.





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