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The Effect of Animated Video Learning on ESI Triage Knowledge and Student Satisfaction of Nursing Polytechnic Health Ministry of Health Makassar

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ABSTRACT
Triage at the hospital's Emergency Room (ER) is critical for prioritizing the care of emergency patients. Triage errors can be dangerous and endanger patient safety, so nursing students should have a solid understanding of triage. This study investigates the impact of ESI triage learning media containing *PowerPoint* and animated films on knowledge, triage decision-making (TDM), and participant satisfaction. The research used a quantitative approach with a Quasi-Experimental pretest-posttest method involving 36 5th semester Diploma Nursing students at the Makassar Ministry of Health Polytechnic. The study was divided into two groups, experimental (animated video learning) and control (*PowerPoint* learning), to evaluate the effect of treatment on knowledge, triage decision-making, and student satisfaction in ESI triage learning. The results of the data analysis show a significant increase in knowledge about ESI Triage and student satisfaction after the intervention, with significant values of 0.001 and 0.018, respectively (*p-value* < 0.05). Although there was no significant increase in Triage decision-making abilities between the groups that used animated videos and Microsoft *PowerPoint* (p = 0.440), the use of animated videos overall increased student responses and satisfaction. MANOVA analysis confirmed that the implementation of animated videos significantly influenced knowledge and satisfaction in students with a *p-value* <0.05. The use of animated videos increases student knowledge and satisfaction significantly compared to PowerPoint, although it does not affect triage decision-making.

Keywords: Animation Video, ESI Triage, Knowledge, Microsoft PowerPoint, Satisfaction, Triage Decision Making

INTRODUCTION

The emergency department (IGD) is an important component of the hospital's healthcare system, and it is tasked with providing initial treatment for patients who experience urgent medical conditions or life-threatening injuries (Biggs et al., 2024; de Lange et al., 2024). In emergencies, speed and accuracy in responding to patients can be important determinants of their safety and health (Burnitt et al., 2024; Taskin et al., 2024). Therefore, the development of a triage system in the emergency room is very important, as the system aims to group patients based on their severity so that medical services can be prioritized properly (Tucker et al., 2023; Xue et al., 2024). One

widely used triage model is the *Emergency Severity Index* (ESI), which has proven effective in accelerating the management of emergency patients by prioritizing them based on the severity of medical conditions (Wibowo, 2020). In this context, nurses have a very important role in triage in the emergency room because they are the first medical personnel to interact with patients and are responsible for assessing and classifying patients according to their level of emergency (Liang et al., 2024; Wu et al., 2024).

Although the importance of triage has been widely recognized, research shows that there are still errors in the application of triage in various hospitals, which can negatively impact patients' clinical outcomes (Mangus et al., 2024). Errors in determining the severity of the patient can result in delays in urgent medical care and even increase the risk of complications or death. Data from the United Kingdom recorded 236 cases of patient misidentification leading to death between November 2003 and July 2005 (Labrague, 2024; Tucker et al., 2023).

Research by Uema et al. (2020) found that triage errors contributed to 14.9% (4 cases) of the total 27 cases of death in one of the hospitals in Surabaya City. Other data in Pekanbaru City and observations show that 5 out of 10 nurses in the emergency room make mistakes in triage, causing patients who need immediate treatment not to receive maximum care (Huriani et al., 2022; Xue et al., 2024). In the Gresik district, other research data showed that 5 out of 12 nurses in hospitals in September 2014 performed actions not in accordance with triage labeling. In interviews, 3-4 nurses revealed that they were confused in determining treatment priorities because patients came simultaneously, and some patients could not wait, even though they could get services at the outpatient poly (Santosa et al., 2014).

In addition, nursing students' knowledge of triage is also an important focus, as they will become holders of similar roles in the emergency room in the future. Research shows that students' knowledge about triage is still lacking, and there are still difficulties in identifying and understanding the parameters underlying the sorting of patients into appropriate categories (Huriani et al., 2022). In an effort to improve students' understanding and skills in the context of triage, the use of audiovisual learning media, such as animated videos, has been proposed as one of the effective approaches. Several studies have shown that learning using animated videos can improve students' understanding and skills in various fields, including triage (AlShaikh et al., 2024).

However, no specific study has investigated the effect of audiovisual animation media on triage knowledge, triage decision-making, and nursing student satisfaction. In this context, this study aims to test whether learning using animated videos can increase knowledge about ESI triage, triage decision-making ability, and student satisfaction with the DI Nursing study program at the Health Polytechnic of the Ministry of Health Makassar. It is hoped that this research can provide new insights in an effort to improve the quality of nursing education in Indonesia.

RESEARCHES METHODS

This study used a quantitative approach with *a quasi-experimental research design using the* pretest-posttest design method. This design was chosen to evaluate

the effectiveness of a treatment or intervention in two compared groups, where both groups were subjected to treatment, with the control group used as a comparison. The study sample is a population of students who have gone through emergency nursing and learning about triage in 4 different classes. From each class, nine respondents were randomly selected, so a total of 36 respondents were selected for this study. To determine the control group, selected respondents chose a lottery paper that determined whether they entered the experimental group (receiving ESI learning with animated videos) or the control group (receiving ESI learning with *Microsoft PowerPoint*).

This method compares the impact of two different types of learning on knowledge of Emergency Severity Index (ESI) triage, triage decision-making (TDM), and student satisfaction with triage learning. By dividing respondents into two groups and providing two different types of learning, we can identify differences in knowledge enhancement and satisfaction between the two groups. This approach provides an opportunity to evaluate the effectiveness of audiovisual learning media, such as animated videos, in improving student understanding and satisfaction in the context of triage learning.

RESULTS AND DISCUSSIONS

The majority of study participants were around 21 years old, and most were women. The general profile of 5th-semester students of the D3 Nursing study program at the Makassar Ministry of Health Polytechnic shows high gender representation in the population. In addition, the normality test confirms that the data obtained tend to be normally distributed, providing a solid basis for using parametric statistical tests in the analysis.

Table 1. Table of Frequency Distribution of Respondents by Age and Gender

Age	N	%
19	3	8,33 %
20	15	41,67 %
21	18	50%
Total	**36**	**100%**
Gender	**N**	**%**
Woman	29	80,56 %
Legal Law	7	19,44 %
Total	**36**	**100 %**

Differences in Knowledge of ESI Triage, Triage Decision Making, and Satisfaction Before and After Intervention in Control Group (Microsoft PowerPoint) Based on Paired Sample T-Test Test Results. In this study, analysis was carried out using a paired t-test control group on three variables, namely Knowledge, Triage decision-making (TDM), and Satisfaction level. The purpose of this analysis was to understand whether there was a significant difference between the scores before and after the intervention in the group using Microsoft PowerPoint. The paired t-test results in the table above, showing the results of the analysis with a significance value (P-value) $p > 0.05$ for

knowledge before and after the intervention, as well as for triage decision making (TDM), showed that there was no statistically significant difference in the two aspects.

There was a knowledge variable. The mean score increased from 10.55 (SD = 3.166) on the pre-test to 11.39 (SD = 2.973) on the post-test, with a p-value of 0.176, indicating that this increase was not statistically significant with a 95% confidence interval (CI) from (-2.87) to (-0.411). For the Triage decision-making variable, the mean score increased slightly from 4.89 (SD = 2.324) on the pre-test to 5.00 (SD = 1.970) on the post-test, with a p-value of 0.579 and a CI of 95% from (-0.525) to (-0.303), indicating an increase that was also not statistically significant. However, in the satisfaction variable, there was a statistically significant improvement, with the mean score rising from 71.44 (SD = 4.921) on the pre-test to 75.27 (SD = 6.096) on the post-test, and a p-value of 0.000 with a CI of 95% from (-12.095) to (-4.683), indicating that the intervention significantly increased student satisfaction.

Table 2. Knowledge of ESI Triage, *Decision Making Triage,* and Satisfaction Before and After Intervention in Control Groups (Microsoft PowerPoint)

Variable		N	Mean (SD)	*P-Value*	95% CI of Difference
Knowledge	For	18	10,55 (3,166)	0,176	(-2,87) -0,411)
	Post	18	11,39 (2,973)		
Triage Decision Making	For	18	4,89 (2,324)	0,579	(-0,525) -0,303)
	Post	18	5,00 (1,970)		
Satisfaction	For	18	71,44 (4,921)	0,000	(-12,095) - (-4,683)
	Post	18	75,27 (6.096)		

Differences in Knowledge of ESI Triage, Triage Decision Making, and Satisfaction Before and After Intervention in the Experimental Group (Animated Video) Based on the Results of the Paired Sample T-Test.

In the table of paired t-test results in the experimental group using animated videos revealing knowledge variables, the mean score increased from 10.72 (SD = 2.287) in the pre-test to 13.39 (SD = 1.335) in the post-test, with a p-value of 0.001, showing a statistically significant increase with a 95% confidence interval (CI) from (-3.563) to (-1.103). For the Triage decision-making variable, the mean score increased slightly from 5.05 (SD = 1.383) on the pre-test to 5.56 (SD = 2.281) on the post-test, but this increase was not statistically significant with a p-value of 0.408 and a CI of 95% from (-2.581) to 1.073. In the satisfaction variable, there was a statistically significant improvement, with the average score rising from 71.94 (SD = 6.876) on the pre-test to 79.38 (SD = 7.907) on the post-test, with a p-value of 0.018 and a CI of 95% from (-6.330) to (-0.670), indicating that the intervention significantly increased student satisfaction.

Table 3. Knowledge of ESI Triage, *Triage Decision Making,* and Satisfaction Before and After Intervention in Experimental Groups (Animated Video)

Variable		N	Mean (SD)	*P Value*	95% CI of Difference
Knowledge	For	18	10,72 (2,287)	0,001	(-3,563) –(-1,103)
	Post	18	13,39 (1,335)		
Triage Decision Making	For	18	5,05 (1,383)	0,408	(-2,581) –1,073)
	Post	18	5,56 (2,281)		
Satisfaction	For	18	71,94 (6,876)	0,018	(-6,330) –(-0,670)
	Post	18	79,38 (7,907)		

Differences in knowledge about ESI triage, triage decision-making, and satisfaction before intervention by comparing the control group (*Microsoft PowerPoint*) and the experimental group (animated video) based on the results of *the Independent Sample T-Test*.

Based on the table above on knowledge variables, the average value for PowerPoint is 10.555 (SD = 1.61690), and for animated videos is 10.7222 (SD = 0.46089), with a p-value of 0.488 and a 95% confidence interval (CI) from (-1.08313) to 0.52758. In the Triage decision-making variable, the average value for PowerPoint is 4.8889 (SD = 2.16629), and for animated videos, it is 5.0556 (SD = 2.15495), with a p-value of 0.818 and a 95% CI from (-1.63031) to 1.29697. For the satisfaction variable, the average value for PowerPoint was 71.4444 (SD = 5.15035), and for animated videos was 71.9444 (SD = 4.84127), with a p-value of 0.766 and a 95% CI of (-2.88586) to 3.88586. These results show that there is no significant difference between the two in increasing knowledge, triage decision-making (TDM), and student satisfaction.

Table 4. Knowledge of ESI triage, triage decision-making, and pre-intervention satisfaction by comparing the control group (Microsoft PowerPoint) and the experimental group (animated video)

Variable		N	Mean (SD)	*P Value*	95% CI of Difference
Knowledge	*PowerPoint*	18	10,555 (1,61690)	0,488	(-1.08313)0,52758)
	Animated Videos	18	10,7222 (0,46089)		(-1,10511)–0,54955)
Triage Decision Making	*PowerPoint*	18	4,8889 (2,16629)	0,818	(-1,63031)– 1,29697)
	Animated Videos	18	5,0556 (2,15495)		(-1,63031)– 1,29697)
Satisfaction	*PowerPoint*	18	71,4444 (5,15035)	0,766	(-2,88586)–3,88586)
	Animated Videos	18	71,9444 (4,84127)		(-2.88633)–3.88633)

Differences in knowledge about ESI triage, triage decision-making, and satisfaction after intervention by comparing the control group (Microsoft Powerpoint) and the experimental group (animated video) based on the results of the Independent Sample T-Test.

Based on the table of post-intervention test results in both groups, In the knowledge variable, the average value for PowerPoint was 11.39 (SD = 2.973), while for animated videos, it was 13.39 (SD = 1.335), with a p-value of 0.014 and a confidence interval (CI) of 95% from (-3.561) to (-0.439), showing a significant increase in the animation video group. In the Triage decision-making variable, the average value for PowerPoint was 5.00 (SD = 1.970) and for animated video was 5.56 (SD = 2.281), but this difference was not statistically significant with a p-value of 0.440 and a 95% CI of (-1.999) to 0.888. For the satisfaction variable, the average value for PowerPoint was 75.27 (SD = 2.030), and for animated video was 79.38 (SD = 3.143), with a p-value of 0.030 and a 95% CI of (-3.792) to (-0.207), indicating a significant increase in the animated video group.

Table 5. Knowledge of ESI triage, decision-making triage, and post-intervention satisfaction by comparing the control group (*Microsoft PowerPoint*) and the experimental group (animated video)

Variable		N	Mean (SD)	*P Value*	95% CI of Difference
Knowledge	*PowerPoint*	18	11,39 (2,973)	0,014	(-3.561) – (-0,439)
	Animated Videos	18	13,39 (1,335)		(-3,587) – (-0,413)
Triage Decision Making	*PowerPoint*	18	5,00 (1.970)	0,440	(-1,999) – (0,888)
	Animated Videos	18	5.56 (2,281)		(-2,000) – 0,889)
Satisfaction	*PowerPoint*	18	75,27 (2,030)	0,030	(-3,792) – (-0,207)

	Animated Videos	18	79,38 (3,143)	(-3,803) –(-0,196)

The effect on knowledge of ESI triage, triage decision-making, and satisfaction is based on the difference between the control group and the experimental group using the Independent Sample T-Test.

Based on the table of the difference values using the independent sample t-test, the knowledge variable shows that the average value of the group using animated video is 2.89 and the group using PowerPoint is 0.06, with a value of p = 0.000, which shows a significant difference between the two groups. Meanwhile, the decision-making triage variable had an average value of 0.72 for animated videos and 0.06 for PowerPoint, with a p-value = 0.266, indicating no significant difference between the two groups. Finally, for the Satisfaction variable, the animated video group had an average value of 8.33, and the PowerPoint group had an average value of 0.22, with a p-value = 0.000, which shows a significant difference in satisfaction levels between the two groups.

Table 6. Knowledge of ESI triage, triage decision-making, and satisfaction based on the difference value between the control group and the experimental group

Variable	Koefisien *Beta* (B)	95% CI of Difference	P-*Value*	*Partial Eta Squared* (%)
Animated Videos	2,722	(0,93 - 4,511)	0,004	0,154
Microsoft PowerPoint (PPT)	0,083	(-0,040) -0,207)	0,181	0,034

The results of the analysis of the effect of ESI triage learning using PowerPoint and animated videos on knowledge, triage decision-making, and satisfaction simultaneously.

The results of the Multivariate Tests (MANOVA) showed a significant difference between the control group (PowerPoint) and the experimental group (Animated Video). Values from Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root, all of which had significance values (Sig.) of 0.000, showed that both factors significantly influenced the overall dependent variable in both groups. Thus, it can be concluded that this makes a significant contribution.

Table 7. Tests of Between-Subjects Effects Between Animation Video and Microsoft PowerPoint

Group	Dominant Variable	Koefisien Beta (B)	Partial Eta Squared (η^2)	Partial Eta Squared (%)
Animation Video	Pengetahuan	8.333	0.510	51.0 %
PPT	Kepuasan	0.222	0.113	11.3%

The animated video variable had a significant influence with a Beta coefficient of 2.722 and a 95% confidence interval between 0.93 to 4.511 and a P value (0.004). However, the size effect (*Partial Eta Squared*) of 15.4% showed a moderate animated video variable, resulting in a marked improvement in the response or to the observed dependent variable. On the other hand, variables *Microsoft PowerPoint* (PPT) showed no significant effect, with a low Beta coefficient (0.083), a 95% confidence interval covering zero (-0.040 to 0.207), and a P value (0.181). Thus, in this context, the use of animated videos is more influential in influencing the dependent variable than the use of *Microsoft PowerPoint* (PPT).

Table 8. Comparison of dominant variables and their influence in animated video and PPT groups

Group	Dominant Variable	Koefisine Beta (B)	Partial Eta Squared (η^2)	Partial Eta Squared (%)
Animated Videos	Knowledge	8.333	0.510	51.0 %
PPT	Satisfaction	0.222	0.113	11.3%

Based on the table above, in the animation video group, the most dominant variable is knowledge, with a beta coefficient of 8.333 and *a partial eta squared* value of 0.510 or 51.0%, showing a very strong and significant influence in improving results. Meanwhile, in the PPT group, the most dominant variable was satisfaction, with a beta coefficient of 0.222 and *a partial eta squared* value of 0.113 or 11.3%, indicating that user satisfaction was the main factor affecting the results in using PPT.

Discussion

This research shows that learning methods have a significant influence on increasing knowledge and student satisfaction in learning ESI triage. The use of animated videos has proven to be more effective than *PowerPoint* in increasing students' understanding of ESI triage concepts and increasing their satisfaction with the learning process. Dynamic visualization and interactive narration in animated videos are able to present information more engagingly and understandably, thus facilitating better absorption of information. Dhulipalla et al. (2023) stated that animated videos are often able to present information visually more dynamically, using interesting images, animations, and narratives. Thus, students tend to be able to absorb information better and more effectively. Schick et al. (2024) found that animated videos are able to present information in a more dynamic, interactive, and easily understood way by students.

Despite differences in knowledge improvement and satisfaction, the results showed that there was no significant difference in triage decision-making ability (TDM) between the group that used animated video and the group that used PowerPoint. This suggests that TDM is more influenced by other factors, such as hands-on practice, practical experience, and individual cognitive abilities in applying knowledge in realistic contexts (Greenlaw et al., 2021). Statistical analysis showed that knowledge variables had a dominant influence on the dependent variable in this study. The significant

increase in knowledge in the group using animated video compared to the group using PowerPoint reflects the relative effectiveness of the learning method in delivering ESI triage learning material (Anaemejeh et al., 2022). The large size effect indicates a substantial contribution of increased knowledge to the dependent variables measured.

The results revealed that animated videos can create a more engaging and enjoyable learning experience for college students, which contributes to higher levels of satisfaction. Dynamic and interactive visual presentations in animated videos are able to retain students' attention better than static presentations in *PowerPoint*, thus creating a more engaging and engaging learning environment (Sallman et al., 2022). In addition, individual variations in learning ability, experience, and cognitive ability also play an important role in determining a student's TDM ability. Factors such as individual intelligence, understanding, and experience level may be more significant in influencing TDM ability than the learning media used (Ongor & Uslusoy, 2023). Therefore, although learning media can influence knowledge improvement, these individual factors are more dominant in determining a student's TDM ability. The results of this study show that animated videos are an effective tool in ESI triage learning, able to increase student knowledge and learning satisfaction significantly. However, triage decision-making ability is more influenced by practical exercises and hands-on experience. Effective learning methods can be considered a combination of various approaches to optimize learning outcomes.

CONCLUSION

This research shows that learning methods using animated videos have a significant influence on increasing student knowledge and satisfaction in learning ESI triage compared to using PowerPoint. Dynamic visualization and interactive narration in animated videos are able to present information more interestingly and understandably, thereby increasing student understanding and involvement in the learning process. Despite this, triage decision-making ability did not show a significant difference between these two learning methods, which suggests that other factors, such as hands-on practice and practical experience, are more influential in this regard. Therefore, it is recommended that educational institutions combine the use of animated videos with hands-on practical sessions to maximize triage learning, thereby not only increasing students' knowledge and satisfaction but also strengthening their ability to triage decision-making. The study had some limitations, including not fully considering external factors such as intelligence levels, individual understanding, and learning preferences that could affect how students absorb information. The learning methods used may not cover all aspects of ESI triage thoroughly, which can affect students' understanding and decision-making abilities. Variations in teaching approaches or lack of emphasis on certain aspects can lead to differences in students' understanding and practical skills.

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