The effectiveness of augmented reality-based gamification in folk poetry learning: integrating local wisdom into education
Gamificación con realidad aumentada para enseñar poesía popular: integrando sabiduría local

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Abstract

Introduction: Exploring technological developments in learning has become a concern for many parties today. One of them is gamification-based Augmented Reality (AR) technology which is packaged with a touch of local wisdom in learning folk poetry. The development of folk poetry learning media with AR technology and gamification was applied to two class groups, namely the control group and the experiment group

Objective: The hypothesis of this research is that there is a significant difference in students' understanding and interest in folk poetry before and after using Folk Poetry Learning Media with Augmented Reality-Based Gamification Techniques.

Methodology: This research method is a study of the development of the ADDIE model in the implementation and evaluation stages. The students analyzed were Grade VII Junior High School students. The interactive qualitative analysis model consists of three components, namely (1) data reduction, (2) data display, and (3) conclusion or verification. Quantitative data were analyzed using ANOVA statistical tests.

Results: Based on ANOVA and t-test analyses, the development of digital technology has had a significant influence on education and learning. Folk poetry media with AR technology and gamification proved to be highly effective as a learning medium with an average above 90% for 14 indicators and 88% for 1 indicator.

Conclusions: This research found that folk poetry learning media designed according to West Sumatra's local wisdom provides emotional connection and strengthens understanding for students. Gamification-based Augmented Reality technology delivers a real and interactive learning experience that makes it easier for students to understand the learning material.

Keywords

Augmented reality; education; folk poetry; gamification; local wisdom.

Resumen

Introducción: La exploración de desarrollos tecnológicos en el aprendizaje se ha convertido en una preocupación para muchas partes en la actualidad. Uno de ellos es la tecnología de Realidad Aumentada (RA) basada en gamificación que se presenta con un toque de sabiduría local en el aprendizaje de la poesía popular. El desarrollo de medios de aprendizaje de poesía popular con tecnología RA y gamificación se aplicó a dos grupos de clase, a saber, el grupo de control y el grupo experimental.

Objetivo: La hipótesis de esta investigación plantea una diferencia significativa en la comprensión e interés de los estudiantes por la poesía popular antes y después de usar Medios de Aprendizaje con Técnicas de Gamificación Basadas en Realidad Aumentada.

Metodología: Esta investigación utiliza el modelo de desarrollo ADDIE en las etapas de implementación y evaluación. Se analizaron a estudiantes de séptimo grado de Educación Secundaria. El modelo de análisis cualitativo interactivo consta de (1) reducción de datos, (2) visualización de datos y (3) conclusión o verificación. El análisis cuantitativo empleó estadísticas de prueba ANOVA.

Resultados: Según los análisis de ANOVA y prueba t, el desarrollo tecnológico digital ha influido significativamente en la educación. Los medios de poesía popular con tecnología RA y gamificación demostraron alta efectividad como medio de aprendizaje, con un promedio superior al 90% para 14 indicadores y 88% para 1 indicador.

Conclusiones: La investigación encontró que los medios de aprendizaje diseñados según la sabiduría local de Sumatra Occidental proporcionan conexión emocional y fortalecen la comprensión estudiantil. La tecnología de Realidad Aumentada basada en gamificación ofrece una experiencia de aprendizaje inmersiva e interactiva que facilita la comprensión del material educativo.

Palabras clave

Educación; gamificación; poesía popular; realidad aumentada; sabiduría local.

Introduction

The results of a study conducted in 2023 show that teachers at the junior high school level in Agam Regency, West Sumatra, face various obstacles in utilizing digital technology for learning purposes (Wulandari et al., 2023; Zulfadhli et al., 2022). In the context of the Subject Teachers' Conference (MGMP), the Indonesian language in Agam Regency has been identified as a significant obstacle in the learning process during the pandemic, especially in terms of making learning videos (Wulandari et al., 2023; Zulfadhli et al., 2022). In addition, the demands of the curriculum and the development of the current world of education require teachers to have a good mastery of technology so that problems that arise in the learning process are often closely related to the use of technology-based teaching materials (Afriyanti et al., 2018; Lestari, 2018; Adisel & Prananosa, 2020; Purnasari & Sadewo, 2020; Basar, 2021).

Learning about folk poetry in the curriculum for the junior high school level is generally limited by a relatively short time, so the potential and power contained in each folk poem cannot be fully conveyed to the students (Wulandari et al., 2022). Folk poetry learning materials are often considered difficult to understand and boring. Many argue that learning about this material has not reached a deep understanding of folk poetry(Kustianingsari & Dewi, 2015; Setiawan, 2018). This situation is assumed to be caused by several factors, such as approaches, models, techniques/strategies, and learning media used by teachers that may not be appropriate or innovative. The availability of limited or less innovative learning media also contributes to the low interest of students in learning old poems (Maryelliwati et al., 2018; Haryono & Suharto, 2021; Purnianingrum & Manuaba, 2022).

Literary learning is believed to have the ability to shape the character of the nation's children in accordance with the values of Pancasila, and folk poetry is one of the relevant forms in this regard (Hidayat et al., 2023; Putri et al., 2023; Sofiyana et al., 2021) Folk poetry is one of the cultural heritage that needs to be preserved and learned by the younger generation. In addition, poetry as a type of folk poetry has been recognized as a world heritage (Heni & Subiyanto, 2021; Netra et al., 2023; Rahmat, Tiawati, et al., 2023). Therefore, research that focuses on developing learning media using Augmented Reality-based gamification techniques in the context of learning folk poetry in junior high schools is very important to carry out. This aims to improve the quality of learning that is more meaningful and supports ethnographic literacy that can strengthen the Pancasila profile of students, especially in the West Sumatra region.

This ethnographic literacy (Zuchdi & Afifah, 2018) is related to strengthening local wisdom. The young generation today is growing up with the presence of various cultures so that not many of them know the cultural strength and local wisdom of their home areas. This shows the importance of presenting local wisdom content in learning to strengthen the nation's character. Learning media with the purity of local wisdom will show the identity and strengthen the character of the nation (Afrianti, 2020; Rahmat et al., 2022; Putra & Putri, 2023).

The Merdeka Curriculum provides a direction for learning that focuses more on improving students' abilities according to their respective interests and abilities (Susilawati, 2021; Yulianti & Wulandari, 2021; Manalu et al., 2022). The application of technology in achieving learning goals is very crucial (Bakri et al., 2020; Ariessanti et al., 2021; Rahma et al., 2021; Yulianti & Wulandari, 2021; Nugroho et al., 2024). The role of technology in learning can increase the attractiveness of the teaching and learning process, which in turn can increase students' interest and motivation to learn. In addition, technology also plays a role in the development of skills that are relevant for the future, such as digital skills, collaboration, and problem-solving (Lestari, 2018; Adisel & Prananosa, 2020; An et al., 2020; Saputra, 2020; Sulisworo, Wulandari, et al., 2021; Indarta et al., 2022; Rahmat, Fitriyah, et al., 2023).

Digital technology's development has significantly influenced the world of education and learning (Fadli et al., 2020). This is also in line with the direction of implementing the independent curriculum at the level of the Education unit (Romadhianti et al., 2021). Some of the learning technologies that have a significant impact on the development of the world of education today are online learning applications, game-based learning(Nilansari Putri et al., 2023; Stalheim & Somby, 2024), distance learning, Virtual and Augmented Reality (VR and AR) technology, and AI-based learning(Buchner & Kerres, 2023; Indarta et al., 2022; Lampropoulos et al., 2022; Pangestu & Rahmi, 2022; Priyadi, 2022). Gamification techniques are one of the techniques that are very close to today's students so that learning becomes more fun (Agustini et al., 2023; Alqarni & Alabdan, 2022; Fajri et al., 2021; Nordin et al., 2022; Yamani, 2021).

Meanwhile, the application of gamification techniques can be made more lively and meaningful with the use of Augmented Reality technology (Bakri et al., 2020; Jung et al., 2020; Purwati, 2019; Rohmaniyah et al., 2021; Sazly et al., 2021; Sriadhi et al., 2022; Stylinski et al., 2021; Sulisworo, Drusmin, et al., 2021; Suprapto et al., 2020; Wahid et al., 2021; Wan Daud et al., 2021; Wiliyanto et al., 2022). Educators need to master the application of technology that is tailored to learning objectives and learning material needs that will be provided to students.

Method

The type of research used is Research and Development (R&D) with a quantitative approach to measure product effectiveness (Dewi et al., 2022; Wulandari et al., 2022; Yusuf & Widyaningsih, 2022). R&D methodology focuses on developing specific products and systematically evaluating their effectiveness (Kustianingsari & Dewi, 2015; Sugiyono, 2019; Wulandari et al., 2021, 2022). The research procedure adapts the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model to design and develop an effective and efficient training program (Dirgayasa et al., 2023; Pribadi, 2014), The following is a chart of the research stages based on the ADDIE model (Bulkani et al., 2022; Latygina et al., 2022; Stolf et al., 2021).

Participants

This research was conducted in Agam Regency, West Sumatra, specifically in three sub-districts: Tanjung Raya, Lubuk Basung, and Tanjung Mutiara. These locations were strategically selected due to their stable internet connectivity, which was essential for the implementation of the study. The research involved six junior high schools: SMP N 1 Tanjung Raya, SMP N 4 Tanjung Raya, SMP N 1 Lubuk Basung, SMP N 3 Lubuk Basung, SMP N 1 Tiku, and SMP N 2 Tiku. The sample consisted of approximately 250 seventh-grade students aged 13-14 years and their respective Indonesian language teachers from each participating school. This comprehensive sampling approach ensured representation across different geographical areas within the regency while maintaining the technical requirements for the research implementation.

Procedure

The research procedure uses the ADDIE model: Three stages of development using the ADDIE model (Alghazzawi et al., 2021; Giena et al., 2022; Pratiwi et al., 2021; Tu et al., 2021) This has been carried out in previous research, the research stage completed the fourth and fifth stages.

1. Analysis

Analysis is used to assess the need for research. The analysis stage begins with conducting an analysis of ethnographic values and teachings in folk poetry and analyzing the needs of junior high school students so that materials for the development of learning media are found. The analysis was carried out through literary cultural studies, observations, and interviews.

2. Design

The design is carried out to produce materials that will be carried out to support the implementation of a research. This planning stage begins with developing the concept of media materials and other things used in the media design process.

3. Development

At this stage, the development of folk poetry media is carried out with AR-based gamification techniques and then a validation process is carried out by experts. AR SALAMIN is the name of a folk poetry learning media that utilizes gamification technology based on Augmented Reality. It was developed and tested for effectiveness on junior high school students in West Sumatra. The product has been developed and validated by a team of media, material, and learning experts.

4. Implementation (Implementasi)

This stage realizes products (folk poetry learning media) in schools.

5. Evaluation (Evaluasi)

The evaluation was carried out by testing the effectiveness of folk poetry learning media with an ANOVA test.

Data analysis

Qualitative Data Analysis

The data analysis used in this study is an interactive qualitative analysis model technique consisting of three components, namely (1) data reduction, (2) data display, and (3) conclusion or verification.

Quantitative Data Analysis

Quantitative data analysis using ANOVA test statistics (Firdaus & Hendradjaya, 2021; Sievert et al., 2019). The ANOVA test (Analysis of Variance) is a statistical analysis technique that compares the averages of three or more different groups or treatments. In this study, an anavore test was conducted to compare the effectiveness of the application of folk poetry learning media with AR-based gamification techniques in 3 sub-districts (Lubuk Basung, Tiku, Maninjau) in Agam Regency using the following formula.

$$F = \frac{\text{Variation between groups}}{\text{Variation in a group}}$$

F= statistical value of the ANOVA test

Variation between groups = the number of variations in the mean between groups

Variation in a group: the number of variations in a group

The results of the ANOVA test will produce an F value and a p-value (Sievert et al., 2019; Budiarti & Riwanto, 2021; Hakim Firdaus & Hendradjaya, 2021). The value of F will be compared with the critical value in the distribution table F with the corresponding degree of freedom between groups (df1) and within groups (df2). If the F-value is greater than the critical value, then it can be said that the difference between the groups is statistically significant. The smaller the p-value, the more significant the difference between the groups.

To complete the results of the ANOVA test analysis, a control group research design was also carried out with pre-test and post-test with stages (1) For students in two control and experimental groups, (2) provide a pre-test for both groups before the application of learning media to assess students' initial understanding of folk poetry. (3) applying AR-based learning media with gamification techniques in the experimental group and conventional media in the control group. (4) Conduct a post-test after the learning media application to assess student understanding improvement for both groups. (4) Independent T-test to compare post-test results between the experimental group and the control group

Results

The effectiveness of folk poetry learning media with AR-based gamification techniques for junior high school students in West Sumatra has been achieved by implementing/implementing SALAMIN Learning Media for junior high school students in West Sumatra. The implementation will be carried out from August 19 to 23, 2024 in three sub-districts: Tanjung Raya, Lubuk Basung, and Tanjung Mutiara. From the three sub-districts, six schools were selected that allowed the SALAMIN media to be implemented, namely SMP N 1 Tanjung Raya, SMP N 4 Tanjung Raya, SMP N 1 Lubuk Basung, SMP N 3 Lubuk Basung, SMP N 1 Tanjung Mutiara, and SMP N 2 Tanjung Mutiara.

The results of the implementation data of the folk poetry learning media are the postes and pretest scores of the control and experimental classes. Qualitative data was also obtained in the form of a questionnaire of respondents' assessment of the folk poetry learning media called SALAMIN.

The following are the analysis results of the ANOVA test analysis from three regions in Agam Regency.

Table 1. ANOVA Test Experimental class at SMP N 4 Maninjau

ANOVA					
Post-test					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	37.933	8	4.742	28.450	.000
Within Groups	1.000	6	.167		
Total	38.933	14			

This research was conducted in an SMP N 4 Maninjau experimental class using SALAMIN. Table 1 shows the post-test data; 15 students participated in this study. The average post-test score of students was 6.27, with a standard deviation of 1,668. The lowest post-test score is 3, while the highest score is 9.

The results of ANOVA's analysis showed significant differences between groups of students based on their post-test scores (F = 28,450, p = 0.000). The "Between Groups" value had a total sum of squares of 37,933 and "Within Groups" of 1,000, indicating that most of the variation in the data stemmed from differences between groups of students, not from variability within the group itself. This indicates that the application of folk poetry media (SALAMIN) significantly influences student learning outcomes in this experimental class.

Table 2. ANOVA Test Control Class at SMP N 4 Maninjau

ANOVA					
Post-test					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	35.058	5	7.012	39.265	.000
Within Groups	1.250	7	.179		
Total	36.308	12			

Table 2 in the control class at SMP N 4 Maninjau, which studied People's Poetry material, post-test data showed that 13 students took part in the evaluation. The average post-test score of students is 7.23 with a standard deviation of 1.739. The lowest score achieved is 5, while the highest score is 9. Descriptive analysis shows that several groups of students have different average scores. For example, two students got an average score of 5.00, while the other group increased average grades to 9.00. ANOVA results showed significant differences in post-test results between groups of students (F = 39.265, p = 0.000). The sum of squares of "Between Groups" is 35,058, while "Within Groups" is 1,250, indicating that the greatest variation in value comes from differences between groups, not from variations within the group itself. This confirms the existence of significant differences between groups of students in the control class.

Table 3. ANOVA Test Experimental Class at SMP N 1 Lubuk Basung

ANOVA					
Post-test					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.257	3	4.752	5.526	.017
Within Groups	8.600	10	.860		
Total	22.857	13			

In the research in the experimental class at SMP N 1 Lubuk Basung with the media of Folk Poetry SALAMIN, Table 3 explained that the post-test data showed that 14 students took the test. The average post-test score of students is 7.29 with a standard deviation of 1.326. The lowest post-test score obtained was 5, while the highest score was 10. Some groups of students obtained different average scores, such as 6.70 for 10 students and 9.50 for 2 students.

ANOVA analysis showed significant differences between groups (F = 5.526, p = 0.017). The value of "Between Groups" has the sum of squares of 14,257, while "Within Groups" is 8,600. These results show that the variation in scores between groups is quite large, indicating the significant influence of folk poetry learning media (SALAMIN) on the post-test results of students in this experimental class.

Table 4. ANOVA Test Control Class at SMP N 1 Lubuk Basung

ANOVA					
Post-test					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	160.629	5	32.126	12.481	.000
Within Groups	38.609	15	2.574		
Total	199.238	20			

Table 4 shows that in the control class at SMP N 1 Lubuk Basung who studied the People's Poetry material, post-test data showed that 21 students took the test. The average post-test score of students is 5.19 with a standard deviation of 3.156. The lowest value is 0, while the highest value reaches 10. Some groups of students have a very variable grade point average, for example 1 student gets a score of 0, 5 students have an average of 1.40, and the other group has a higher average score such as 9.50.

The ANOVA results showed that there were significant differences between groups of students (F = 12,481, p = 0.000). The sum of squares "Between Groups" was 160,629 and "Within Groups" was 38,609, indicating that the largest variation in post-test scores came from differences between groups of students, indicating that the differences in learning outcomes in the control class were quite significant. This shows that although some students get high grades, other groups score very low, so the distribution of grades in this class is quite diverse.

Table 5. ANOVA Test Experimental Class at SMP N 3 Lubuk Basung

ANOVA					
Post-test					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	226.168	8	28.271	42.305	.000
Within Groups	17.375	26	.668		
Total	243.543	34			

In the experimental class at SMP N 3 Lubuk Basung that studied People's Poetry material, post-test data showed that 35 students took part in the evaluation. The average post-test score of students is 4.69 with a standard deviation of 2.676. The lowest value is 0, while the highest value reaches 9. The distribution of grades in these classes varies widely, with some groups of students obtaining low grades such as 0.88 for 8 students, while other groups obtaining higher grades, such as 8.17 for 6 students.

ANOVA analysis showed significant differences between groups (F = 42.305, p = 0.000). The sum of squares "Between Groups" is 226,168, while "Within Groups" is 17,375. This shows that the differences between groups are huge, indicating significant variation in student learning outcomes. With a very low significant value (p = 0.000), these results indicate that the Folk Poetry learning media (SALAMIN) in this experimental class has a diverse impact on student performance.

Table 6 ANOVA Test Control Class at SMP N 3 Lubuk Basung

ANOVA					
Post-test					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.209	3	6.070	8.852	.002
Within Groups	8.229	12	.686		
Total	26.437	15			

In the control class at SMP N 3 Lubuk Basung that studied People's Poetry material, Table 6 shows that post-test data showed that 16 students took the test. The average post-test score of students is 7.81 with a standard deviation of 1.328. The lowest score achieved is 5, while the highest score is 10. Some groups of students showed clear variations in average scores, with an average score of 6.71 for 7 students and 9.00 for 3 students.

ANOVA results showed significant differences between groups of students (F = 8.852, p = 0.002). The sum of squares "Between Groups" is 18,209, while "Within Groups" is 8,229. This shows that the differences in learning outcomes between groups in the control class are quite significant. Groups with higher scores such as 9 and 10 were fewer, but they greatly impacted the overall average.

Table 7 ANOVA Test Experimental class d SMP N 2 Tanjung Mutiara

ANOVA					
Post-test					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	55.778	9	6.198	9.596	.002
Within Groups	5.167	8	.646		
Total	60.944	17			

In the experimental class at SMP N 2 Tanjung Mutiara, which used People's Poetry media, post-test data showed that 18 students participated in the evaluation. The average post-test score of students is 6.06 with a standard deviation of 1,893. The lowest post-test score is 3, while the highest score is 9. Some groups of students have varying average scores, ranging from 3.50 for two students to 9.00 for one student.

ANOVA results showed significant differences between groups of students (F = 9.596, p = 0.002). The sum of squares "Between Groups" is 55,778, while "Within Groups" is 5,167, which suggests that the variation in post-test results stems largely from differences between groups of students. This indicates that the application of Folk Poetry learning media (SALAMIN) significantly impacts student performance in this experimental class, with clear differences among the group results.

Table 8 ANOVA Test Control Class of SMP N 2 Tanjung Mutiara

ANOVA					
Posttes					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	49.385	5	9.877	6.173	.001
Within Groups	32.000	20	1.600		
Total	81.385	25			

In the control class at SMP N 2 Tanjung Mutiara, who studied People's Poetry material, post-test data showed that 26 students participated. The average post-test score of students is 6.85 with a standard deviation of 1.804. The lowest score obtained is 0, while the highest score reaches 9. Some groups of students showed variation in test results, with an average score of 5.00 for 8 students and 8.50 for 6 students.

ANOVA results showed significant differences between groups of students (F = 6.173, p = 0.001). The sum of squares "Between Groups" is 49,385 and "Within Groups" is 32,000, which shows that the variation in values between groups is quite significant. These results indicated differences in learning outcomes among groups of students, even though they were in a control class. This reflects that even though experimental methods are not used, student performance has considerable variation.

Based on the results of the ANOVA test in each school, it showed significantly higher results in improving student learning outcomes with the application of SALAMIN's folk poetry learning media. The control class also experienced an increase but did not provide a large variation in students' performance. Furthermore, the results of the independent t-test analysis compared to the results of the ANOVA test are described in table 9 and table 10.

Table 9 ANOVA Test Results and Experimental Class Independent T-Test

School	ANOVA Test	independent (2-tailed) t-test 0,071	Interpretation Media Salamin
SMP N 1 Tanjung Raya	F = 28.450, p = 0.000	t = -2,537	Effective and meaningful
SMP N 1 Lubuk Basung	F = 5.526, p = 0.017	t = 0,761	Efective and non-negotiable
SMP N 3 Lubuk Basung	F = 42.305, p = 0.000	t = -6,612	Effective and meaningful
SMP N 2 Tanjung Mutiara	F = 9.596, p = 0.002	t = -8,475	Effective and meaningful

Based on the analysis of ANOVA and t-test in tables 9 and 10, it can be stated that the development of digital technology has significantly influenced the world of education and learning (Fadli et al., 2020). This is also in line with the direction of implementing the independent curriculum at the level of educational units (Romadhianti et al., 2021). Some of the learning technologies that have a significant impact on the development of the world of education today are online learning applications, game-based learning, distance learning, Virtual and Augmented Reality (VR and AR) technology, and AI-based learning(Buchner & Kerres, 2023; Indarta et al., 2022; Lampropoulos et al., 2022; Pangestu & Rahmi, 2022;

Priyadi, 2022). Gamification techniques are one of the techniques that are very close to today's students so that learning becomes more fun (Agustini et al., 2023; Alqarni & Alabdan, 2022; Fajri et al., 2021; Nordin et al., 2022; Yamani, 2021). Meanwhile, the application of gamification techniques can be made more lively and meaningful with the use of Augmented Reality technology (Bakri et al., 2020; Jung et al., 2020; Purwati, 2019; Rohmaniyah et al., 2021; Sazly et al., 2021; Sriadhi et al., 2022; Stylinski et al., 2021; Sulisworo, Drusmin, et al., 2021; Suprapto et al., 2020; Wahid et al., 2021; Wan Daud et al., 2021; Wiliyanto et al., 2022). The application of technology is important for educators to master that are tailored to the learning objectives and learning material needs that will be provided to students. In connection with the results of the ANOVA analysis and the t-test, supporting the results of the effectiveness test were also measured by the assessors of accompanying teachers and students who received treatment using SALAMIN media with fifteen indicators of the effectiveness of SALAMIN media as a learning medium depicted in figure 1.

Table 10. ANOVA Test Results and Independent Control Class T-Test

School	ANOVA Test	independent (2-tailed) t-test 0,071	Interpretation of Folk Poetry Learning
SMP N 1 Tanjung Raya	F = 39.265, p = 0.000	t = -1,921	There was a considerable difference in results with the experimental class and it was not significant
SMP N 1 Lubuk Basung	F = 12.481, p = 0.000	t = -1,326	There was a considerable difference in results with the experimental class and it was not significant
SMP N 3 Lubuk Basung	F = 8.852, p = 0.002	t = -0,649	There was a considerable difference in results with the experimental class and it was not significant
SMP N 2 Tanjung Mutiara	F = 6.173, p = 0.001	t = -1,648	There was a considerable difference in results with the experimental class and it was not significant

Figure 1. The Effectiveness of Salamin as a Folk Poetry Learning Media
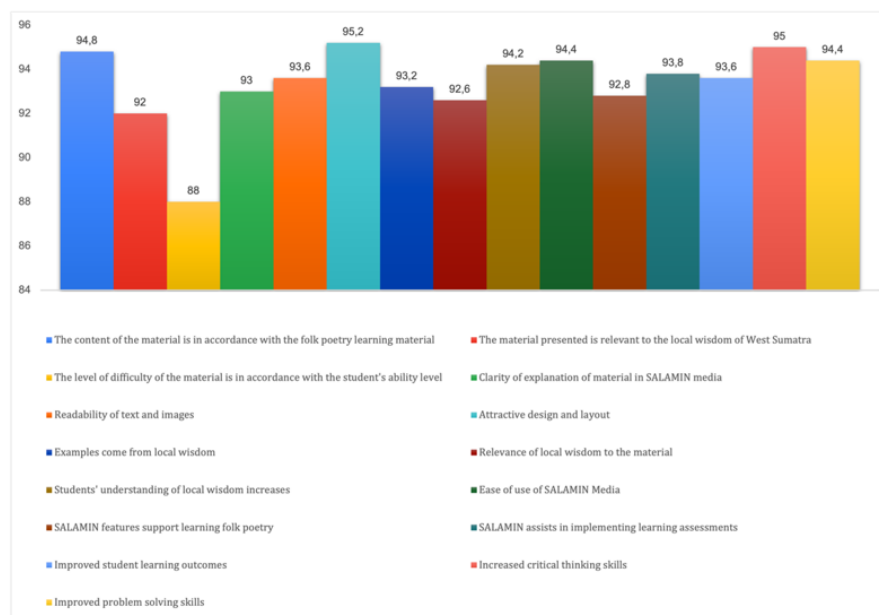
Based on figure 1, SALAMIN media can be considered very effective as a learning media for folk poetry with an average of above 90% for each indicator. Of the fifteen indicators, only 1 indicator related to the difficulty level of the material obtained an average of below 90 with a percentage of 88%. Regarding the achievement category, 88% has been able to stretch very well. Therefore, the application of AR technology (Apriliya et al., 2023; Hui et al., 2024) In the learning media Gamification-based Salamin is a media that has the potential to provide an increase in students' understanding of folk poetry materials and become a media that displays the real world of abstract concepts with technological advances(Lim & Kamin, 2023; O'Connor & Mahony, 2023; Qubais et al., 2024). Using SALAMIN media provides direct learning opportunities and makes learning more fun and meaningful.

Discussion

The ANOVA analysis and t-test results from Tables 9 and 10 indicate that the development of digital technology has significantly impacted education and learning (Fadli et al., 2020). These findings align with the direction of the Merdeka Curriculum implementation, which emphasizes flexibility, differentiation, and the use of technology to support more innovative and interactive learning (Fauziah, 2021; Romadhianti et al., 2021; Yunefri et al., 2024). Today's most impactful educational technologies include online learning applications, game-based learning, distance learning, Virtual Reality (VR) and Augmented Reality (AR) technologies, and AI-based learning. One particularly effective approach is gamification, which has been proven to enhance students' motivation and engagement in the learning process (Fajri et al., 2021; Yamani, 2021; Alqarni & Alabdan, 2022; Nordin et al., 2022; Agustini et al., 2023).

AR technology and gamification have been developed in the SALAMIN learning media in folk poetry learning, which incorporates Minangkabau local wisdom. This media is designed to present Minangkabau folk poetry, such as pantun, gurindam, and syair, which contain cultural values, the philosophy of "Adat Basandi Syara', Syara' Basandi Kitabullah," (Heni & Subiyanto, 2021; Rahmat et al., 2023; Halimatussa'diyah et al., 2024) and other local wisdom reflecting the life of Minangkabau society. AR technology allows students to engage more deeply with the material, such as visualizing digital representations of characters or cultural settings relevant to the folk poetry content. Gamification in this media is implemented through interactive quizzes, cultural exploration missions, and narrative-based challenges that encourage students to understand folk poetry through an engaging game-like experience.

The effectiveness of Minangkabau local wisdom in AR and gamification-based learning media is evident in the increase in students' interest and comprehension. Before using SALAMIN, many students found folk poetry difficult and irrelevant to their lives. However, after experiencing AR and gamification-based learning with a cultural approach closely related to their daily lives, students showed a significant increase in motivation. They became more enthusiastic about exploring the content of folk poetry and found it easier to understand its meanings and values. This aligns with previous studies stating that culturally responsive learning can enhance student engagement and strengthen conceptual understanding (Purwati, 2019; Bakri et al., 2020; Jung et al., 2020).

Beyond increasing learning interest, the use of SALAMIN has also contributed to improving students' understanding of folk poetry. The effectiveness test results indicate that students who learned using AR and gamification-based cultural technology scored higher in comprehension compared to those who used conventional methods. This is due to a deeper interaction with the material, where students could visually experience folk poetry representations and follow the structured narrative within the gamification design. Thus, the research hypothesis stating that AR and gamification-based folk poetry learning media with Minangkabau local wisdom can enhance students' learning interest and comprehension is statistically proven.

Furthermore, the effectiveness test results, which involved assessments from supervising teachers and students, show that SALAMIN meets fifteen indicators of effective learning media. Teachers reported that AR technology and gamification made it easier for them to explain folk poetry more contextually and engagingly. Students also found it easier to understand folk poetry because they could see, hear, and interact directly with the material through digital devices. AR technology's visual and interactive aspects play a crucial role in helping students connect folk poetry content with the Minangkabau cultural context more deeply.

In terms of student engagement, the gamification techniques applied in SALAMIN successfully increased their active participation in learning. Students who were previously passive in folk poetry learning became more involved due to game-based challenges, interactive roles in digital storytelling, and competitive elements in Minangkabau cultural quizzes. This highlights that digital technology integrated with local culture can create a more enjoyable and meaningful learning experience, aligning with the principles of culturally responsive teaching.

Overall, the findings of this study provide significant implications for the future development of technology-based learning media. The integration of AR and gamification with local wisdom not only enhances learning effectiveness but also contributes to the preservation of local culture. With media like

SALAMIN, students study folk poetry as part of the curriculum and understand, appreciate, and help preserve Minangkabau culture in a digital context. Therefore, further developments in technology-based cultural learning innovation should continue to support the strengthening of local identity in education in the digital era.

In this context, educators need to master digital learning technologies that align with the learning objectives and content needs. In relation to the ANOVA and t-test results, the effectiveness of SALAMIN as a learning media is also supported by assessments from supervising teachers and students who have used this media, based on fifteen indicators of effective learning media. These findings demonstrate that the use of AR technology and gamification in culturally integrated learning is an innovative solution to improving education quality in the digital era.

Conclusions

The findings of this study confirm the research hypothesis that there is a significant difference in students' understanding of and interest in folk poetry before and after using Folk Poetry Learning Media with Augmented Reality-Based Gamification Techniques. Integrating AR technology and gamification with Minangkabau local wisdom has been proven to enhance students' motivation and comprehension effectively. Prior to using this learning media, students exhibited lower engagement and found folk poetry difficult to relate to. However, after experiencing interactive and culturally immersive learning, students demonstrated higher enthusiasm, better conceptual grasp, and deeper appreciation of folk poetry. The ANOVA and t-test results support these findings, reinforcing the effectiveness of technology-enhanced, culturally responsive learning approaches in fostering student engagement and understanding.

These results are important for developing digital learning media and culturally integrated education. First, the successful implementation of AR and gamification techniques in folk poetry learning suggests that similar approaches can be applied to other subjects to make traditional knowledge more relevant to modern students. Second, this study highlights the importance of incorporating local wisdom into digital learning innovations, ensuring that education enhances cognitive skills and preserves and strengthens cultural identity. Lastly, the findings emphasize the need for teachers to be trained in using digital learning tools effectively so that they can leverage technology to create meaningful, interactive, and engaging learning experiences. Future research can explore expanding AR-based gamification for broader linguistic and literary studies, as well as investigating its long-term impact on students' cultural awareness and critical thinking skills.

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