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INTEGRATING AI IN EDUCATIONAL GAME DESIGN: A ROBLOX-BASED APPROACH TO PRESERVING SUNDANESE TRADITIONS FOR YOUNG LEARNERS

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ABSTRACT

This study aims to design a conceptual framework for an educational game based on the Roblox platform that integrates Artificial Intelligence (AI) technology to support the preservation of Sundanese culture among children aged 6–10 years. In today's digital era, children are more attracted to interactive media and have limited exposure to local cultural values. Therefore, adaptive learning and Natural Language Processing (NLP) approaches are utilized to create a personalized and communicative learning experience. This research employs a descriptive qualitative approach, with data collected through literature review, observation of Roblox content, and analysis of Sundanese cultural elements. The findings indicate that integrating AI into culturally-based educational games holds significant potential to enhance children's engagement in learning local culture in a contextual and enjoyable manner.

Keywords: Educational Game, AI, Adaptive Learning, NLP, Sundanese Culture, Roblox

ABSTRAK

Penelitian ini bertujuan untuk merancang kerangka konseptual game edukatif berbasis platform Roblox yang mengintegrasikan teknologi kecerdasan buatan (Artificial Intelligence/AI) untuk mendukung pelestarian budaya Sunda pada anak usia 6–10 tahun. Di era digital saat ini, anak-anak lebih tertarik pada media interaktif dan kurang terpapar nilai-nilai budaya lokal. Untuk itu, pendekatan adaptive learning dan Natural Language Processing (NLP) dimanfaatkan untuk menciptakan pengalaman belajar yang personal dan komunikatif. Metode penelitian ini menggunakan pendekatan kualitatif deskriptif, dengan teknik pengumpulan data melalui studi pustaka, observasi konten Roblox, dan analisis konten budaya Sunda. Hasil temuan menunjukkan bahwa integrasi AI dalam game edukatif budaya memiliki potensi tinggi untuk memperkuat keterlibatan anak dalam pembelajaran budaya lokal secara kontekstual dan menyenangkan.

***Kata Kunci**: Game Edukatif, AI, Adaptive Learning, NLP, Budaya Sunda, Roblox*

INTRODUCTION

The preservation of local culture poses a significant challenge in the current digital age, as the younger generation, particularly young children, grow up in an environment increasingly influenced by global culture, leading to a decline in their understanding of and connection to local heritage such as language, traditional games, and customary values (Hazarika et al., 2024; Manago & McKenzie, 2022)n this era of globalization, innovative and relevant approaches are needed to instill cultural values from an early age, so they are not eroded by modernity (Nahak, 2019; Yang & Li, 2022).

One potential approach is through interactive digital media such as educational games (Kankaanranta et al., 2017; S & R, 2024). The Roblox platform, popular among children and teenagers, provides a creative virtual world that enables engaging, collaborative, and immersive learning experiences (Faridah & Deng, 2024). The use of Roblox in educational contexts has proven effective in increasing children's participation and engagement in various informal learning topics (Meier et al., 2020). By using Roblox as an educational medium, children can learn while playing in an environment that aligns with their developmental stage, making the learning process feel more natural and enjoyable.

On the other hand, advancements in artificial intelligence (AI) have unlocked new possibilities for developing learning media. AI can create more personalized, adaptive, and interactive learning experiences, for instance, by tailoring content based on a player's needs or preferences, providing intelligent real-time feedback, and even identifying the most effective learning style for each individual (Akavova et al., 2023; Chen et al., 2020). The integration of AI into educational game design is believed to enhance both user engagement and the effectiveness of content delivery, including in the context of cultural education (Feng & Heng, 2024; Westera et al., 2020).

This research stems from the need to integrate three key elements: Sundanese local culture, Roblox-based educational game technology, and artificial intelligence. The objective is to establish a single conceptual framework that can serve as a basis for developing cultural learning media that is both effective and relevant to the

characteristics of the current digital generation. Rather than immediately building a prototype, this study focuses on a literature review, a needs analysis, and the design of an educational concept that leverages the potential of AI for the preservation of Sundanese culture through a Roblox-based educational game.

Based on this problem, this research will examine the potential utilization of the Roblox platform as an educational medium for the preservation of Sundanese culture among young children. Furthermore, it will discuss how artificial intelligence can be conceptually integrated into the educational game design to support the cultural learning process. This study will also explore relevant elements of Sundanese culture that can be packaged as interactive educational content within the game, as well as formulate a preliminary design for a Roblox-based educational game that incorporates Sundanese cultural elements with an AI-driven approach.

The objective of this research is to examine the potential of using Roblox as an educational medium for the preservation of local culture, specifically Sundanese culture, and to develop a conceptual framework for integrating AI into educational game design intended for children. This study also aims to identify and map Sundanese cultural content suitable for inclusion in interactive learning media, as well as to design a preliminary concept for a Roblox-based educational game capable of introducing Sundanese culture to young children in a way that is engaging, enjoyable, and adaptive to their learning needs.

METHODS

This study employs a descriptive qualitative approach, utilizing methods of literature review and conceptual analysis. Its primary objective is to develop a conceptual design framework for a Roblox-based educational game that integrates elements of Sundanese culture and artificial intelligence (AI) within the context of early childhood learning. This research is not experimental or prototype-driven; rather, it is oriented towards theoretical exploration and the formulation of a design concept based on existing literature and the needs of digital native children (Creswell & Creswell, 2018).

This research is categorized as a non-experimental qualitative study employing a conceptual design approach. The focus is on developing a conceptual framework that can serve as a foundation for the development of educational digital media, without involving direct programming or prototype testing. This model aligns with the conceptual design approach in educational technology, where initial design and the formulation of a theoretical framework are crucial steps before the implementation process is carried out (Stolterman & Wiberg, 2010).

For data collection, three primary techniques are employed: literature review, cultural document analysis, and indirect observation. The literature review is conducted by gathering and examining various scholarly sources, including journal articles, conference proceedings, academic books, and research reports on topics relevant to this study, such as the integration of AI in educational games (Joshi, 2023; Katonáné Gyönyörű, 2025; Tan et al., 2025), the utilization of Roblox in education (Hernández et al., 2022; Zhai, 2024), cultural preservation through digital media (Dialektika et al., 2025; Robertus & Rasmita, 2025), early childhood developmental psychology, as well as Sundanese cultural values. These literature sources help to establish a theoretical foundation and identify best practices that can be adapted into the educational game design.

Additionally, an analysis of Sundanese cultural documents is conducted to identify cultural elements that are relevant and comprehensible to young children. Data is collected from sources such as digital archives, cultural encyclopedias, and local content textbooks, as well as visual and audiovisual documentation of folktales, traditional games, basic Sundanese language, traditional attire, and specialty foods. This process aims to screen and select cultural content that is educational, representative, and viable as learning material within a digital game.

To supplement the understanding of educational game design practices for children, indirect observation of various examples of children's educational games on Roblox and similar platforms is also conducted. This observation aims to identify visual patterns, interaction styles, reward systems, and features that can attract interest and

maintain the attention of children aged 6–10. The observational data helps in formulating targeted and child-friendly interactive features.

All collected data is analyzed using a descriptive qualitative approach. The analysis stages include: first, identifying patterns in content and features from successfully implemented educational games; second, categorizing Sundanese cultural elements suitable for young children; and third, the preliminary design of an AI-based educational game model integrated into the Roblox platform. This analysis results in a conceptual design framework that includes several key elements: culture-based learning objectives, selected Sundanese cultural content, concepts for AI features such as adaptive learning and Natural Language Processing (NLP), and the gameplay flow and basic forms of interaction between the child and the game system.

Through this method, the study seeks to establish a solid and comprehensive foundation for developing technology-based cultural educational media that is relevant to the needs and characteristics of today's generation of children.

RESULTS AND DISCUSSION

This research results in a conceptual framework for a Roblox-based educational game aimed at preserving Sundanese culture for young children. The game is designed with an Artificial Intelligence (AI) approach, specifically utilizing features like adaptive learning and Natural Language Processing (NLP). The study's findings were developed from a process of literature review, indirect observation of educational games, and analysis of Sundanese cultural content.

Data from Literature Review and Observations

a. Literature Review on AI in Educational Games

Table 1. Literature Review on AI in Educational Games

Aspect	Key Findings
Role of AI	Enables personalized learning and real-time content adaptation
Adaptive Learning	Modifies difficulty levels or content based on player performance
NLP (Natural Language Processing)	Enables natural language interaction between players and the system (text/voice)

Source: Personal Documentation

The literature review indicates that AI in educational games plays a crucial role in personalizing learning, enabling the system to adjust content based on user

performance. The adaptive learning feature is used to regulate difficulty levels and learning scenarios. Meanwhile, NLP facilitates natural interaction between the player and the system through text or voice, thus allowing the learning of local languages like Sundanese to take place interactively.

b. Observation of Children's Educational Games (on Roblox and Similar Platforms)

Tablel 2. Observation of Children's Educational Games (on Roblox and Similar Platforms)

Game Name	Learning Features	Strengths	Weaknesses
Museum Tycoon (Roblox)	Exploration of cultural artifacts	Visually engaging, lots of interactive spaces	Limited local features and language support
ABC Games: Phonic & Tracing (Play Store)	Basic letters and numbers	Interactive, suitable for early childhood	Lacks local/Indonesian cultural context

Source: Personal Documentation

Observations of several educational games on Roblox reinforce these findings. Examples such as Museum Tycoon and ABC Games: Phonics & Tracing show that appealing visuals, exploratory spaces, and simple interactions are highly favored by children. However, local or Indonesian cultural content is still very minimal, indicating a significant opportunity to introduce more contextual educational games.

User Needs Analysis (Children Aged 6–10 Years)

A needs analysis, based on literature in child developmental psychology and informal interviews with early childhood education (ECE) teachers, identified that children aged 6–10 require learning media that is highly visual, colorful, has a simple storyline, and offers gentle challenges accompanied by repetition and immediate feedback. Culturally and linguistically relevant media is also considered more readily accepted as it provides a sense of emotional connection and a familiar learning environment.

AI Integration in Games: Principles of Adaptive Learning and NLP

a. Principle of Adaptive Learning

In the designed game, AI is utilized as an adaptive regulator for the child's learning process. A child who is able to complete a mission quickly will be offered new, more complex challenges, whereas a child who struggles will be given additional visual cues or mission repetitions. This allows learning to proceed at each individual's own pace.

Table 3. Examples of Adaptive Learning Principle Implementation

Player Level	System (AI) Response
Child understands quickly	Challenges are increased (new missions, more difficult vocabulary)
Child struggles	System provides additional hints, visual aids, or repetition

Source: Personal Documentation

b*. Natural Language Processing (NLP)*

NLP is implemented in the form of recognition and processing of the child's voice or text input, for instance, when greeting a character in Sundanese ("Sampurasun") or answering questions from a virtual grandfather NPC (Non-Playable Character). The NLP will evaluate the child's response and provide feedback, whether in the form of motivation, suggestions, or learning repetition. This interaction model integrates technology with language learning in a natural and contextual manner.

NLP Scheme in Games:

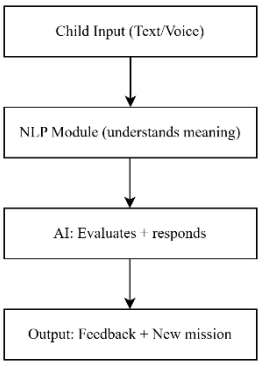

Figure 1. NLP Scheme in Games
Source: Personal Documentation

Example: The child types/says “Sampurasun” → The system recognizes it → AI responds: “Wilujeng sumping di kampung adat!” (Welcome to the traditional village!)

Conceptual Design of an Educational Game

The game begins with avatar and language selection, followed by the exploration of a traditional village and the completion of cultural missions. The AI will provide real-time guidance and adapt challenges, awarding badges or cultural rewards upon mission completion.

Table 4. Framework for Educational Game Design

Component	Details
Platform	Roblox Studio
Theme	Exploration of a Sundanese Cultural Village
Target Users	Children aged 6–10 years
Cultural Content	Sundanese language, traditional clothing, traditional games, food, folk songs
AI Features	Adaptive learning, NLP (Sundanese pronunciation and vocabulary)
Mission System	Complete challenges: identifying objects, dialogues, assembling angklung, playing dakon/egrang
Reward System	Culture stars, virtual certificates, badges

Source: Personal Documentation

Conceptual Scheme of an AI-Based Educational Game with Sundanese Culture

The following is the gameplay flow from the child's perspective:

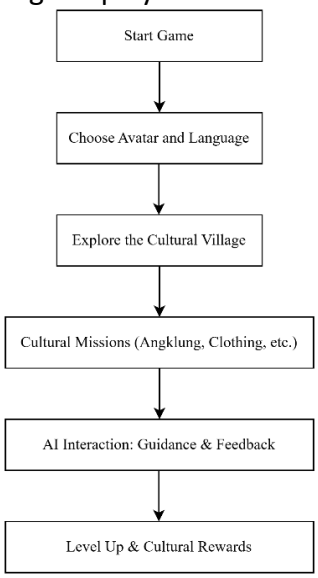

Figure 2. Gameplay Flow from the Child's Perspective
Source: Personal Documentation

The NLP Scheme Supports Two-Way Dialogue:

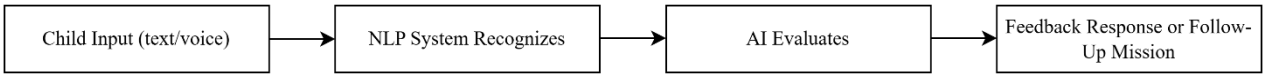

Figure 3. NLP Scheme Supporting Two-Way Dialogue
Source: Personal Documentation

Relationship Between Methods and Results

Table 5. Relationship Between Methods and Results

Method Component	Result Obtained
Literature Review	Theoretical foundation of AI, adaptive learning, NLP, and educational games
Cultural Content Analysis	Relevant Sundanese cultural elements for children
Educational Game Observation	Appealing features that can be adapted from popular games
Conceptual Design	Design of mission system, AI features, and Sundanese cultural village theme

Source: Personal Documentation

The resulting game design demonstrates a strong connection between the methodology and the outcomes. Each method contributes directly to the formulation of the game's content, features, and structure.

Game Flow Simulation and the Role of AI at Each Stage

To strengthen the validity of this design, the following is a simulation of the game flow from the player's (child's) perspective, along with the AI interventions at each stage:

Table 6. Game Flow Simulation and the Role of AI at Each Stage

Game Stage	Child's Activity	AI Role (Adaptive + NLP)
Registration and Avatar Selection	The child selects a male/female avatar and chooses the language (Sundanese/Indonesian)	AI stores initial preferences to personalize dialogue and cultural content
Exploring the Cultural Village	The child explores traditional houses, gardens, and playgrounds	AI monitors the child's interests: preference for music, stories, or physical games
Cultural Mission #1 – Playing Angklung	The child arranges the angklung and mimics the basic tones	NLP detects the child's voice when naming Sundanese notes and provides voice feedback
Cultural Mission #2 – Egrang & Dakon	The child learns about traditional games	AI adjusts difficulty level (hints, speed) based on performance in previous missions
Cultural Mission #3 – Sundanese Language	The child dialogues with a virtual grandfather: "Kumaha damang?" – "Alhamdulillah, damang."	NLP recognizes spoken or written responses; AI scores, gives suggestions, or repeats
Rewards & Cultural Reflection	The child earns badges and unlocks new traditional clothing	AI tracks progress and encourages continued learning with relevant content

Source: Personal Documentation

The gameplay simulation illustrates how AI operates adaptively and interactively at each stage, from avatar selection to reward distribution. AI not only supports the

technical aspects of the game but also serves as a learning guide that responds to the child's needs and abilities.

Concept Validation (Initial Feasibility Analysis)

To assess the feasibility of the design, a SWOT analysis was conducted based on literature, the characteristics of Roblox, and early childhood education principles.

Table 7. SWOT Analysis of the Sundanese Culture Roblox Game Concept

Source: Personal Documentation

Aspect	Description
Strengths	- Platform is familiar to children - AI support enables a more adaptive and personalized experience
Weaknesses	- Requires digital literacy support from teachers/parents - No automatic system for local content safety yet
Opportunities	- Can be used as an informal learning medium for early childhood and elementary education - Can be expanded with content from other local cultures
Threats	- Risk of children becoming dependent on screens/games - Lack of infrastructure readiness in certain schools

This finding indicates that, conceptually, the game has great potential, although its implementation will require a strong support ecosystem, such as teacher training and online content moderation.

Comparison with Previous Studies

The following is a comparison between the design of this study and similar previous research studies:

Table 8. Comparison with Previous Studies

Researcher	Research Focus	AI	Local Culture	Game Platfro m
Faridah et al. (2024)	Science educational game on Roblox	x	x	□
Dialektika et al. (2025)	Folklore in digital media	x	□	x
This Study	AI + Sundanese Culture in Roblox educational game	□	□	□

Source: Personal Documentation

Compared to other research, this design combines three key strengths: an educational game platform, adaptive AI, and local cultural content. This combination constitutes the primary uniqueness and novelty of this study. For example, Faridah et

al. (2024) focuses solely on educational games on Roblox without a cultural context, whereas Dialektika et al. (2020) focus on folklore without AI or game interactivity.

Interactive Design Visualization

Child–Game–AI Interaction Diagram (Simplified)

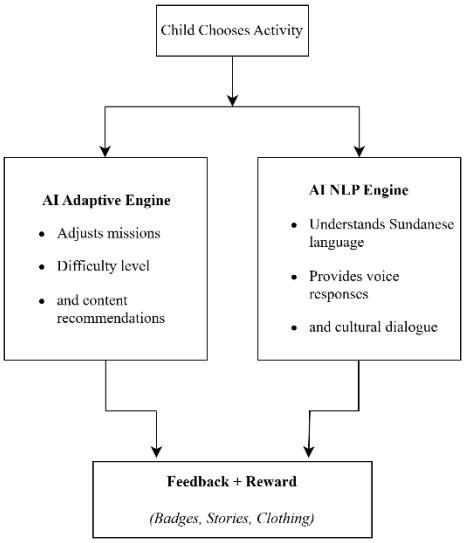

Figure 4. Child–Game–AI Interaction Diagram (Simplified)
Source: Personal Documentation

This model illustrates how the AI system plays an active role in guiding a child's learning through play, functioning not merely as a content presenter but as a digital learning companion.

Reflection & Implementation Feasibility

The conceptual design developed in this study demonstrates a high level of suitability for implementation in early childhood education, particularly at the preschool and early elementary levels, where children are in the concrete-operational stage of cognitive development. The educational game designed not only offers an enjoyable play experience but also integrates educational and cultural content simultaneously, thus bridging the needs of learning and the preservation of local values. Furthermore, this design holds strong potential for sustainable development through collaboration with the increasingly active community of local creators on the Roblox platform, enabling participatory content updates and cultural expansion.

However, the implementation of this design also faces several challenges that must be addressed. One of the main issues is the need for supervision in the use of online-based games, considering the risks of exposure to external content or uncontrolled screen time for children. Therefore, the role of parents and educators is crucial in guiding the use of this game. In addition, the design needs to be realized in the form of a prototype to allow empirical testing of its effectiveness through user studies. Further development also requires basic training for teachers and parents so they can understand how the AI system in the game works and make the most of its educational potential in both home and school learning activities.

DISCUSSION

This research has successfully established a comprehensive and innovative conceptual framework for a Sundanese cultural preservation educational game by synergistically integrating three key pillars: the immersive Roblox platform, adaptive Artificial Intelligence (AI) technology, and rich local cultural content. The primary strength of this proposed design lies not in its individual components, but in their complex interaction. The Roblox platform, as supported by observations of games like Museum Tycoon, serves as an engaging and familiar "vessel" or playground for children, effectively overcoming the initial challenge of user engagement. Meanwhile, AI transforms this vessel into an intelligent learning ecosystem. Through its adaptive learning feature, AI acts as a "regulator" that personalizes the pace and difficulty of learning according to individual abilities, ensuring that no child is left behind or feels bored. On the other hand, the implementation of Natural Language Processing (NLP) serves as a bridge for contextual language learning, allowing children to practice dialogue in Sundanese with an NPC as if interacting with a digital learning companion, rather than merely memorizing vocabulary. Finally, the carefully curated Sundanese cultural content acts as the "soul" of the game, providing meaning, fostering identity, and directly addressing the issue of cultural erosion raised at the beginning of the study.

The validity and feasibility of this concept are reinforced by a robust methodological foundation. The literature review not only confirms the effectiveness of AI in personalizing learning but also provides a strong theoretical basis. The needs analysis, grounded in developmental psychology literature and input from educators, ensures that the game design—with its appealing visuals, simple storyline, and immediate feedback—is highly aligned with the cognitive characteristics of children aged 6–10. The SWOT analysis also provides a balanced and realistic perspective, acknowledging the design's significant potential while honestly identifying challenges such as the need for parental supervision. The primary novelty of this research lies in its holistic synthesis of these three elements, effectively filling a gap in previous research. Whereas other studies, such as those by Faridah et al. (2024) or Dialektika et al. (2025), focus on only one or two aspects (a game without culture, or culture without interactive AI), this study offers a new paradigm that integrates all three.

Consequently, the implications of this research extend beyond the mere design of a game; it offers a replicable model for proactive cultural preservation in the digital age. The design holds potential for sustainable development through collaboration with the local creator community on Roblox, enabling participatory updates and cultural content expansion. Nevertheless, its practical implementation demands serious attention to several challenges. The need for parental and teacher supervision to mitigate the risks of exposure to external content and uncontrolled screen time is paramount. Therefore, the logical next step is to realize this conceptual framework as a functional prototype. Developing this prototype will enable the empirical testing of its effectiveness through user studies and will form the basis for creating simple training modules for educators and parents. Ultimately, this research has successfully laid a strong foundation for the development of cultural educational media that is not only technologically relevant but also sensitive to the psychological needs of children and the urgent need for local heritage preservation.

CONCLUSION

This study has produced a conceptual framework for designing an educational game based on the Roblox platform that integrates Sundanese cultural elements with artificial intelligence (AI) technology, particularly adaptive learning and Natural Language Processing (NLP) features. The framework is designed for children aged 6–10 years as an interactive medium that enhances cultural literacy in a contextual and enjoyable manner.

The findings indicate that Roblox, as an open platform, offers great potential to create engaging virtual worlds aligned with children's developmental stages. The integration of AI allows the in-game learning system to become more personalized and adaptive, adjusting to each child's abilities and preferences. The use of NLP within the game also strengthens the child's interaction in learning the Sundanese language in a natural and communicative way.

Sundanese cultural elements featured in the game such as traditional games, traditional clothing, regional music, and everyday conversation are highly engaging and relevant as educational content. The reward system, adventure scenarios, and the presence of cultural characters provide additional motivation for children's learning.

Overall, this educational game concept not only supports the preservation of local culture but also enriches the digital learning experience of Indonesian children through an approach tailored to the characteristics of today's digital generation.

Nevertheless, it should be acknowledged that this study remains conceptual in nature and has certain limitations, particularly in terms of empirical validation and in-depth exploration of the technical challenges of implementing AI within a game environment such as Roblox. The main scientific contribution of this study lies in the development of a holistic conceptual framework that synergistically integrates a popular educational game platform (Roblox), adaptive artificial intelligence technologies (through Adaptive Learning and NLP), and the rich local Sundanese cultural content. This combination offers a new paradigm for digital cultural

preservation, filling the research gap left by previous studies that tended to focus only on one or two aspects.

LIMITATIONS AND FUTURE RESEARCH

Although the proposed conceptual framework in this study demonstrates significant potential, several limitations must be acknowledged and considered as a focus for further development. First, this study is non-experimental and does not involve the development of a functional prototype or direct empirical testing with users. This means that the validity and effectiveness of the design in real learning scenarios still require confirmation through field studies.

Second, the implementation of AI, particularly NLP for Sundanese language recognition, will face technical challenges related to the availability of training data, model accuracy, and the ability to handle dialectal or accent variations in children. Failures in speech or text recognition could diminish the interactive experience and reduce the effectiveness of language learning. Moreover, the issue of local content security and moderation within an open platform such as Roblox requires a more robust automated system to ensure a safe and age-appropriate learning environment.

Based on these limitations, future research is strongly recommended to focus on the following directions:

1) Functional Prototype Development: Develop a functional prototype of the Roblox-based educational game to enable empirical testing. This would involve integrating Sundanese cultural elements, Adaptive Learning features, and basic NLP modules.

2) User Validation Studies: Conduct user studies with the target group of children aged 6–10 and educators to evaluate effectiveness, engagement, and learning experiences. These tests may employ mixed methods to collect both qualitative and quantitative data.

3) Exploration of Advanced AI Methods: Investigate the application of more advanced AI methods, such as reinforcement learning for more dynamic adaptive

personalization, or the development of NLP models specifically optimized for Sundanese using child-focused datasets.

4) Content Moderation System Design: Develop and test automated or semi-automated systems to monitor and moderate user-generated content (if any) and in-game interactions to ensure cultural appropriateness and child safety.

5) Cross-Cultural Comparative Studies: Extend this framework to other local cultures in Indonesia or globally to test the generalizability of the model and to identify best practices in digital cultural preservation through AI-based educational games.

RECOMMENDATIONS

Based on the findings and conclusions of this study, it is recommended that the proposed conceptual framework be followed up with the development of a tangible educational game prototype. This prototype is essential for testing the effectiveness of the artificial intelligence features, the validity of the cultural content, and the real-time user responses, particularly from children as the primary target audience. Further development should be carried out through cross-disciplinary collaboration involving game designers, AI technology experts, early childhood educators, and Sundanese cultural practitioners to ensure a balance between educational value, user experience, and cultural richness.

In addition, this game concept has the potential to be integrated into local content learning at the elementary education level, particularly in subjects related to regional culture and language. In this way, the game can serve not only as an educational entertainment medium but also as a complementary tool in formal school education. Since the game is online-based, it requires supervision by teachers and parents to ensure healthy, safe, and moderate use, especially considering the risk of screen dependency among children.

Looking ahead, the designed framework also holds the potential for broader development by adapting cultural content from other regions across Indonesia. As such, this approach can serve as a model for culturally based technology driven

preservation that is more inclusive and aligned with the learning dynamics of the digital generation in various parts of the country.

REFERENCES

Akavova, A., Temirkhanova, Z., & Lorsanova, Z. (2023). Adaptive learning and artificial intelligence in the educational space. *E3S Web of Conferences*, *451*. https://doi.org/10.1051/e3sconf/202345106011

Chen, L., Chen, P., & Lin, Z. (2020). Artificial Intelligence in Education: A Review. *IEEE Access*, *8*, 75264–75278. https://doi.org/10.1109/ACCESS.2020.2988510

Creswell, J. W., & Creswell, J. D. (2018). *Research Design Qualitative, Quantitative, and Mixed Methods Approaches* (Fifth Edition). https://spada.uns.ac.id/pluginfile.php/510378/mod_resource/content/1/creswell.pdf

Dialektika, J. S., Febrianto, P. T., Dyah Puspitasari, A., Pritasari, A. C., Razali, A., & Sulaiman, S. (2025). Digitalization of intangible cultural heritage in the era of disruption: Utilization of social media in cultural preservation and education in schools. *Jurnal Sosiologi Dialektika*. https://doi.org/10.20473/jsd.v20i12025.13-28

Faridah, I., & Deng, C. (2024). Approach and Application of the Roblox Application as a Learning Medium. *Scientechno: Journal of Science and Technology*, *3*(3), 263–281. https://doi.org/10.70177/scientechno.v3i3.1395

Feng, L. W., & Heng, H. Y. (2024). Research on the application of artificial intelligence technology in teaching the cultural inheritance and innovation of urban public space. *Applied Mathematics and Nonlinear Sciences*, *9*(1). https://doi.org/10.2478/amns-2024-1498

Hazarika, A., Bora, B., & Nath, M. (2024). THE IMPACT OF DIGITAL MEDIA ON THE CULTURAL IDENTITY OF NORTH EAST INDIA. *International Journal Of Novel Research And Development*. www.ijnrd.org

Hernández, L., Hernández, V., Neyra, F., & Carrillo, J. (2022). The use of Massive Online Games in game-based learning activities. *Revista Innova Educación*, *4*(3), 7–30. https://doi.org/10.35622/j.rie.2022.03.001

Joshi, M. (2023). Adaptive Learning through Artificial Intelligence. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4514887

Kankaanranta, M., Koivula, M., Laakso, M. L., & Mustola, M. (2017). Digital games in early childhood: Broadening definitions of learning, literacy, and play. In *Serious Games and Edutainment Applications: Volume II* (pp. 349–367). Springer International Publishing. https://doi.org/10.1007/978-3-319-51645-5_16

Katonáné Gyönyörű, K. I. (2025). Adaptive learning systems and artificial intelligence in language learning. *Gradus*, *12*(1). https://doi.org/10.47833/2025.1.art.010

Manago, A. M., & McKenzie, J. (2022). Culture and Digital Media in Adolescent Development. In *Handbook of Adolescent Digital Media Use and Mental Health* (pp. 162–187). Cambridge University Press. https://doi.org/10.1017/9781108976237.010

Meier, C., Saorín, J. L., León, A. B. de, & Cobos, A. G. (2020). Using the Roblox Video Game Engine for Creating Virtual tours and Learning about the Sculptural Heritage. *International Journal of Emerging Technologies in Learning*, *15*(20), 268–280. https://doi.org/10.3991/ijet.v15i20.16535

Nahak, H. M. I. (2019). UPAYA MELESTARIKAN BUDAYA INDONESIA DI ERA GLOBALISASI. *Jurnal Sosiologi Nusantara*, *5*(1), 65–76. https://doi.org/10.33369/jsn.5.1.65-76

Robertus, I., & Rasmita, R. (2025). Preserving the Cultural Heritage of Indonesian Society through Digital Preservation in Libraries. *Knowledge Garden*, *3*(1), 48–63. https://doi.org/10.21776/ub.knowledgegarden.2025.3.1.32

S, M. J., & R, C. (2024). Developing Local Games for Enhancing Numeracy Skills in Primary Schools in Tanzania: A Participatory Approach. *East African Journal of Science*, *5*(2).

Stolterman, E., & Wiberg, M. (2010). Concept-driven interaction design research. *Human-Computer Interaction*, *25*(2), 95–118. https://doi.org/10.1080/07370020903586696

Tan, L. Y., Hu, S., Yeo, D. J., & Cheong, K. H. (2025). Artificial intelligence-enabled adaptive learning platforms: A review. In *Computers and Education: Artificial Intelligence* (Vol. 9). Elsevier B.V. https://doi.org/10.1016/j.caeai.2025.100429

Westera, W., Prada, R., Mascarenhas, S., Santos, P. A., Dias, J., Guimarães, M., Georgiadis, K., Nyamsuren, E., Bahreini, K., Yumak, Z., Christyowidiasmoro, C., Dascalu, M., Gutu-Robu, G., & Ruseti, S. (2020). Artificial intelligence moving serious gaming: Presenting reusable game AI components. *Education and Information Technologies*, *25*(1), 351–380. https://doi.org/10.1007/s10639-019-09968-2

Yang, W., & Li, H. (2022). Curriculum Hybridization and Cultural Glocalization: A Scoping Review of International Research on Early Childhood Curriculum in China and Singapore. *ECNU Review of Education*, *5*(2), 299–327. https://doi.org/10.1177/20965311221092036

Zhai, J. (2024). The Use of Roblox in Elementary School Science Education during Pandemics. *Open Journal of Social Sciences*, *12*(05), 462–472. https://doi.org/10.4236/jss.2024.125025