IBANIFY: A Gamified Digital Learning Environment for Iban Language and Cultural Literacy

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ABSTRACT - This article presents a study on the design and evaluation of IBANIFY, a gamified digital learning environment developed to support beginner learners of the Iban language. Grounded in the ADDIE instructional design framework, the project aims to create an engaging, accessible, and culturally enriched language learning experience through the integration of interactive and game-based learning components. The platform incorporates key features such as digital dictionaries, interactive quizzes, structured grammar activities, and embedded cultural content, all designed to enhance learner engagement, motivation, and cross-cultural understanding. The study involved 20 Iban Language majors from Universiti Pendidikan Sultan Idris and employed a quantitative research approach to examine learners' perceptions of the platform and its influence on their learning experience. Data were collected using survey instruments with Likert-scale items focusing on usability, engagement, perceived learning support, and overall effectiveness of the gamified elements. The findings provide insights into how game-informed design features contribute to learner motivation and perceived learning value, while also identifying areas for further refinement. By addressing limitations found in existing Iban language learning resources, IBANIFY offers a more tailored and interactive solution for minority language education. This research contributes to the field of games and gamification in education by demonstrating how culturally grounded content and gamified learning mechanics can be meaningfully integrated into digital language learning platforms, providing a practical design reference for future game-based language learning initiatives.

INTRODUCTION

In the digital era, technology integration in education has become increasingly important, and Malaysia has actively promoted digital learning initiatives, as outlined in the Malaysian Education Blueprint 2013–2025 (Ministry of Education, 2024). Despite this progress, learners of the Iban language continue to face challenges due to the limited availability of engaging and comprehensive digital learning resources. (Roseni & Muho, 2024). Many existing materials rely on traditional approaches with minimal interactivity and limited cultural context, which can hinder both language acquisition and appreciation of Iban heritage.

To address this gap, IBANIFY was developed as a digital learning platform to support the teaching and learning of the Iban language through interactive and gamified features. The platform offers a range of learning tools, including a digital dictionary, vocabulary quizzes, grammar activities, speaking practice, and cultural content. By incorporating interactive elements, IBANIFY aims to improve learner engagement and support more effective language learning experiences.

This study focuses on the development of IBANIFY and the evaluation of its effectiveness in supporting Iban language learning. The objectives are to provide structured digital learning resources, integrate cultural elements into the learning process, and examine students' learning experiences and perceived language development after using the platform. The research involves university students majoring in Iban studies, with comparisons made before and after their use of the platform.

The remainder of this article is organised as follows. The literature review discusses existing Iban language learning resources and related educational approaches. The methodology section describes the research design and development process of IBANIFY. The findings and discussion present the evaluation results, followed by the conclusion, which summarises key findings and outlines directions for future improvements.

LITERATURE REVIEW

The literature review provides the theoretical background and context for this study by examining previous research relevant to digital language learning and cultural education. This section reviews studies related to the development of IBANIFY, a digital learning platform designed to support the learning and appreciation of the Iban language and culture. It explores the use of digital learning resources in language education, the integration of cultural elements into language instruction, and the effectiveness of interactive and technology-enhanced approaches in supporting language learning. By synthesising findings from established studies and credible sources, this review establishes a strong foundation for the study and informs the design and implementation of IBANIFY in accordance with current research and best practices.

The Use of Multimedia Learning Resources

Digital learning resources have transformed educational practices by enabling flexible, engaging, and learner-centred learning environments (Saad et al., 2017). When enhanced with gamification mechanics, digital tools such as e-books, multimedia content, and online learning platforms can significantly improve learner motivation, engagement, and knowledge retention. Common gamification elements including points, levels, badges, progress indicators, and immediate feedback (Arpin & Yatim, 2021). These gamification elements support self-paced learning while encouraging goal-oriented participation and sustained involvement. These mechanics help learners visualise progress, maintain motivation, and actively engage with language tasks.

Multimedia features such as audio recordings and video demonstrations further strengthen learning outcomes by supporting pronunciation practice and contextual language use. Suboh, Ibrahim & Aziz (2023) highlight that well-designed multimedia content enhances cognitive processing and language acquisition. In addition, interactive challenges and quizzes allow learners to apply knowledge in meaningful contexts, reinforcing learning through repetition and feedback.

From a social learning perspective, gamified digital environments also promote collaboration and peer interaction through shared challenges, discussion spaces, and comparative progress indicators, aligning with Vygotsky's social constructivist theory (Rohman & Endang, 2022). For less commonly taught languages such as Iban (Shin, 2021), gamified digital platforms address the scarcity of traditional learning materials by providing accessible and up-to-date resources (Norouzkhani et al., 2025). At the same time, embedding cultural content within game-based activities supports both language development and cultural appreciation, positioning gamification as an effective approach for minority language education (Zain et al., 2020).

To evaluate the effectiveness of these gamification mechanics, this study empirically examines learners' perceptions of engagement, usability, and perceived learning support after using the platform. Quantitative data collected through structured surveys and Likert-scale instruments provide evidence

of how specific gamified features contribute to learner motivation and language learning experiences. These findings offer measurable insights into the role of gamification in supporting digital language learning for minority languages.

Iban Language Learning Strategies

Effective language learning strategies improve both proficiency and cultural understanding. Interactive tools such as digital dictionaries, vocabulary quizzes, and structured grammar lessons support retention and engagement by making learning active and meaningful (Jimbai, Banseng & Handrianto, 2024). Multimedia resources, including audio and video, are crucial for pronunciation and comprehension because they provide combined auditory and visual support that reinforces learning (Unal, 2022; Chachil et al., 2015). Integrating cultural elements (such as folklore, traditions, and everyday practices) fosters deeper connections with the language and increases learner motivation (Khudaverdiyeva, 2024). Recent research on Iban language learning highlights that interactive mobile applications with multimedia features receive positive usability and motivation feedback from learners, suggesting digital formats can make Iban more accessible and engaging (Jeckie & Ariffin, 2023; Saad et al., 2017). Gamification mechanics like points, badges, levels, and progress tracking can further enhance engagement by giving learners clear goals, immediate feedback, and rewarding progression (Munusamy, Yatim & Suhaimi, 2025). Technologies such as voice recognition improve pronunciation and speaking confidence, while hybrid models that blend digital tools with traditional instruction provide more well-rounded educational experiences.

Existing Product

Popular language learning platforms such as Duolingo, Memrise, and Busuu use different approaches to support language learning. Duolingo applies gamification through points, rewards, and progress tracking to keep learners motivated. Memrise focuses on vocabulary learning using spaced repetition and multimedia flashcards, while Busuu offers structured lessons and opportunities to interact with native speakers. These platforms provide useful reference points for the development of IBANIFY by demonstrating effective strategies for learner engagement and retention.

However, each platform also has limitations. Duolingo's strong gamification features are sometimes balanced by limited depth in grammar learning (Short et al., 2023). Memrise is effective for memorisation but relies heavily on user-generated content, which can affect consistency Aprizal & Wachyudi, 2024). Busuu supports real-life communication but restricts many features to paid users (Sridhivya, Gurusamy, & Balamurali, 2024). More importantly, none of these platforms include cultural content that is specific to the Iban language and community.

IBANIFY addresses this gap by combining gamification, structured learning, and cultural integration in a single platform. It uses features such as badges, progress tracking, and interactive quizzes to motivate learners, while embedding Iban folklore, traditions, and everyday life into learning activities. The platform provides organised lessons covering vocabulary, grammar, pronunciation, and cultural knowledge, supported by multimedia such as native-speaker audio, videos, and real-life scenarios. A culturally themed interface further enhances immersion, making IBANIFY a more relevant and meaningful learning environment for Iban language learners.

METHODOLOGY

This section explains the research methodology used in this study, including the research scope, instructional design model, product development process, research instruments, and data analysis methods. A clear and systematic methodology is essential to ensure that the study is well planned and that the findings are reliable and meaningful. For this purpose, the ADDIE instructional design model was adopted, which consists of five phases which are analysis, design, development, implementation, and evaluation (Adeoye et al., 2024).

The methodology provides a structured framework to guide the development and evaluation of IBANIFY. It outlines how the platform was designed, developed, and tested to meet the objectives of

the study. This section also describes the research scope, the instruments used for data collection, and the methods applied to analyse the data.

ADDIE as the Instructional System Design Model

The ADDIE model was used to guide the instructional system design model for the development of IBANIFY. This model includes five phases, as depicted in Figure 1, which are, Analyze, Design, Develop, Implement, and Evaluate. These phases will ensure that the platform is well planned, effectively developed, and carefully evaluated.
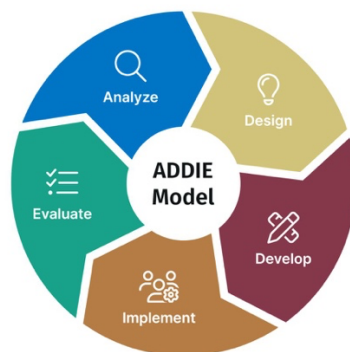

Figure 1. ADDIE as the Instructional System Design Model

a) Analyze Phase: This phase focused on understanding the needs and challenges of Iban language learners. Surveys were used to examine learners' proficiency levels, preferred learning methods, and the limitations of existing learning resources. Technical requirements, including software and hardware needs, were also identified to ensure that the platform would be accessible and function smoothly. Initial surveys with university students were conducted to identify difficulties in learning the Iban language. The results showed a lack of engaging digital learning materials, limited cultural content, and insufficient tools for practising pronunciation. These findings were used to define the development needs of IBANIFY and to guide the inclusion of features that address these learning gaps.

b) Design Phase: Based on the analysis, the overall structure of IBANIFY was planned, including the user interface, learning content, and system features. Key elements such as vocabulary quizzes, grammar lessons, and multimedia materials were outlined. A system flowchart was also created to ensure a clear and user-friendly learning experience. A structured design framework was created to define the user interface, interactive features, and multimedia elements of the system. The design focused on easy navigation, engaging visuals, and a clear learning flow. Storyboards and wireframes were developed using Figma to show the layout and structure of the platform before development.

c) Develop Phase: The platform was developed using HTML, CSS, JavaScript, and PHP, with XAMPP for database management. Learning materials were created and integrated, including an Iban–Malay digital dictionary, pronunciation support, and cultural content. Interactive quizzes and multimedia features were added to improve learner engagement. Visual Studio Code was used to develop key features such as vocabulary lessons, quizzes, and voice recognition. A MySQL database managed through XAMPP was integrated to store user accounts and learning data. Multimedia materials, including images, videos, and native-speaker audio recordings, were added to support language learning.

d) Implement Phase: IBANIFY was introduced to the target users, who were guided on how to use the system. The platform was tested on different devices, including computers, tablets, and smartphones, to ensure stable performance and usability. A trial version of IBANIFY was provided to 20 university students, who used the platform over a fixed period. Brief training sessions were held to help users become familiar with the system and use its learning features effectively.

e) Evaluate Phase: A user acceptance test was conducted to assess usability, content quality, and learner engagement. The feedback collected was analysed and used to improve the platform before its full use. Feedback was collected through surveys that focused on user experience, engagement,

and perceived learning outcomes. The responses were analysed to evaluate the platform's effectiveness and to identify areas for improvement. Based on this feedback, refinements were made to enhance the overall learning experience.

IBANIFY User Interface

Figure 2 shows the IBANIFY home screen, which serves as the main entry point to the platform. It displays the platform name, a culturally themed background, and a short tagline that invites users to begin learning. The simple and clean design helps users navigate the system easily.

The main menu functions as the central hub of the platform and includes three interactive buttons, which are the Not (Notes), Latih (Quiz), and Not Tambah (Additional Notes). Each button represented by a clear icon. A Pansut (Exit) button is in the top-right corner. This organised layout supports ease of use and allows learners to access the main features smoothly.
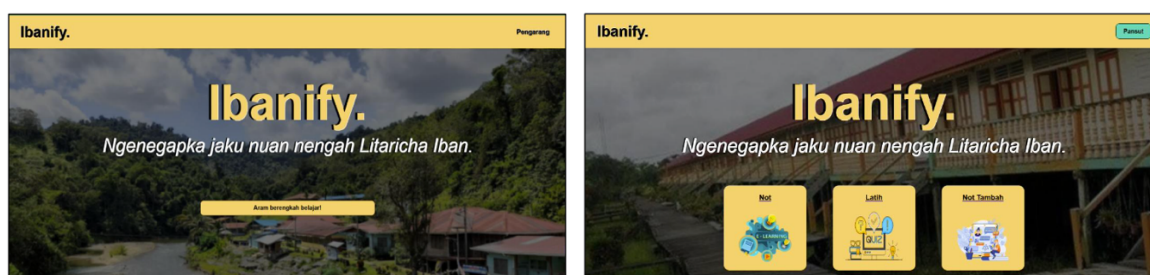

Figure 2. Home Screen Interface (left) and Main Menu Interface (right)

Figure 3 shows the Notes with Voice Recognition screen in IBANIFY, designed to combine language learning with interactive gamified elements. Users can learn Iban phrases alongside English translations, with each topic (e.g. Tema: Tabi for "Greetings") including a brief introduction and interactive phrase buttons. A speaker icon allows learners to hear correct pronunciations, supporting click-and-repeat practice. Learners earn progress points and visual feedback for completing exercises, motivating repeated practice and mastery of vocabulary and pronunciation.

The Additional Notes screen integrates cultural learning with gamified features. Each topic (e.g. Tema: Adat for "Customs") introduces key Iban cultural elements such as Pengerami Gawai Dayak, Miring, Ngayap, and Tuak, presented as interactive buttons with explanations in both Iban and English. Completing these cultural modules contributes to learners' overall progress and unlocks visual rewards, enhancing engagement. By combining language practice, cultural exploration, and gamified feedback, IBANIFY offers an immersive and motivating learning experience that strengthens both Iban language skills and cultural understanding.

Figure 3. Notes with Voice Recognition Interface (left) and Additional Notes without Voice Recognition Interface (right)

Figure 4 shows the *Quiz Screen* in the IBANIFY platform, which integrates multimedia elements, such as images, audio, and video, to enhance engagement and understanding. For example, an image of a market provides visual context, helping learners connect vocabulary to real-life situations. Audio and video clips support pronunciation, listening practice, and cultural awareness. By combining these multimedia features, the quiz screen creates an interactive and effective learning experience that accommodates different learning styles.
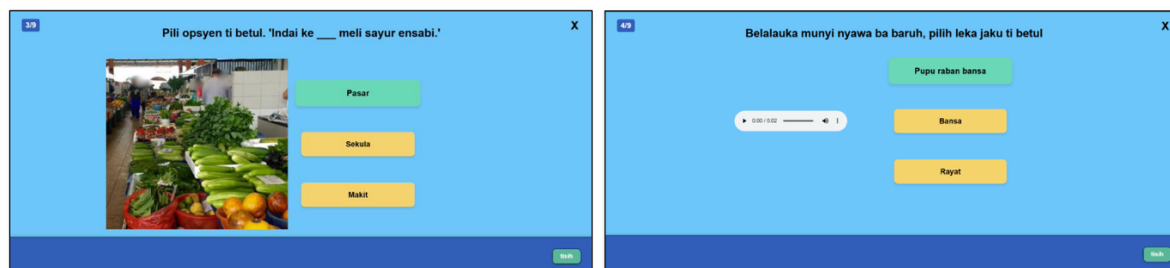

Figure 4. Quiz Screen with Image (left) and with Audio (right) as Multimedia Content

USER ACCEPTANCE TEST

The user acceptance test was conducted to evaluate IBANIFY in terms of usability, engagement, and learning effectiveness. A total of 20 university students majoring in Iban at Universiti Pendidikan Sultan Idris (UPSI) participated. They were selected as the target group because they represent learners who benefit from structured and interactive digital tools for Iban language learning. Their feedback provided insights into the platform's ability to enhance engagement and language proficiency.

A structured questionnaire was designed to assess multiple aspects of IBANIFY, including usability, engagement, content effectiveness, and multimedia integration. The usability section examined user experience, ease of navigation, and interface design to determine whether the platform was intuitive and accessible. The engagement section measured learners' interest and motivation while using the platform, assessing its capacity to sustain participation. Content effectiveness focused on the usefulness of vocabulary lessons, grammar modules, and quizzes in supporting language learning. Multimedia integration evaluated the impact of features such as voice recognition, cultural content, and audio-visual materials on the learning process.

Responses were collected using a five-point Likert scale (1 = Very Poor, 5 = Very Well), providing quantifiable data to evaluate the effectiveness of IBANIFY in supporting Iban language learning.

Table 1. Likert Scale and Levels

Scale	Level
1	Very Poorly
2	Poorly
3	Moderately
4	Well
5	Very Well

The survey responses were analysed using SPSS (Statistical Package for the Social Sciences), with descriptive statistics such as means, percentages, and standard deviations to summarise user feedback. Graphs and charts were used to visualise trends in learner engagement, motivation, and progress while using IBANIFY. A comparative analysis of pre- and post-implementation data was conducted to assess the platform's impact on language proficiency and the effectiveness of gamified features, such as points, badges, quizzes, and interactive challenges, in sustaining learner participation and enhancing the overall learning experience.

RESULTS AND DISCUSSION

This section presents the study's findings based on data collected through Google Form questionnaires. The responses were analysed using SPSS to evaluate user feedback and assess the effectiveness of the IBANIFY platform. A preliminary questionnaire was administered before the development phase to gather initial insights, while a follow-up evaluation questionnaire was conducted after the pilot test to examine user experience, usability, and learning outcomes. The study involved 20 respondents, all students enrolled in the Iban Language Minor Subject, ensuring consistent feedback across both phases. In addition, an Iban Language lecturer provided expert input to validate the findings. The results presented here correspond to the research objectives and provide guidance for refining the platform to enhance learner engagement and language learning effectiveness.

The study included 20 university students majoring in Iban at Universiti Pendidikan Sultan Idris (UPSI). The demographic analysis (Table 2) showed a nearly balanced gender distribution, with 45% male and 55% female participants. All respondents were aged between 21 and 25, representing the primary group of young adults studying Iban academically. Most participants (90%) were taking Iban as a minor subject, while 10% were enrolled as an open elective. This ensured that feedback on IBANIFY came from learners with a genuine interest in the language, making their insights highly relevant for assessing the platform's usability, feasibility, and effectiveness.

Table 2. Gender Distribution (left) and Age Distribution (right)

Gender	Total of Respondent	Percentage (%)	Age	Total of Respondent	Percentage (%)
Male	9	45%	18 – 20	0	0
Female	11	55%	21 - 25	20	100%
			26 - 30	0	0
Total	20	100%	Total	20	100%

Findings on Usability of IBANIFY

User feedback on IBANIFY's usability and gamified features was highly positive, as showed in Table 3. Ninety percent of respondents strongly agreed that the platform's interface was easy to navigate and that instructions were clear, with a mean score of 4.90. Engagement was enhanced by gamification mechanics, such as points, badges, progress tracking, and interactive quizzes, which 70% of users reported kept them actively involved in learning activities. Additionally, 65% indicated that these features motivated them to study the Iban language more consistently. These results demonstrate that the platform's design, interactive elements, and gamified rewards effectively support ease of use, sustained engagement, and learner motivation, making IBANIFY a user-friendly and motivating tool for language acquisition.

Table 3. Usability of IBANIFY

Item	Percentage Scale (%)					Mean
	5	4	3	2	1	
How well does the interface of Ibanify make it easy to navigate through the platform?	90%	10%	0	0	0	4.90
How well does Ibanify provide clear instructions for its use?	90%	10%	0	0	0	4.90
How well does the app engage you during learning activities?	70%	30%	0	0	0	4.70
How well does Ibanify help you stay motivated to learn the Iban language?	65%	35%	0	0	0	4.65

Findings on Feasibility of IBANIFY

As showed in Table 4, the feasibility of IBANIFY was evaluated in terms of its integration of cultural content, support for pronunciation, and multimedia features. Seventy percent of respondents strongly

agreed that the platform effectively incorporated Iban cultural elements, creating a meaningful connection between language learning and cultural understanding. The voice recognition feature received a perfect score of 5.00, with all participants agreeing that it improved their pronunciation. Similarly, 100% of users found multimedia resources including audio, video, and images, which are highly effective, while 80% noted that the platform accommodated their individual learning pace. Gamified elements such as progress tracking, interactive quizzes, and rewards further enhanced engagement and motivation. These results indicate that IBANIFY offers a culturally immersive, interactive, and flexible learning experience, making it a valuable tool for Iban language education.

Table 4. Feasibility of IBANIFY

Item	Percentage Scale (%)					Mean
	5	4	3	2	1	
How well does Ibanify integrate cultural elements of the Iban community into its lessons?	70%	30%	0	0	0	4.70
How well does the voice recognition feature of Ibanify help in improving your pronunciation?	100%	0	0	0	0	5.00
How well does Ibanify support your learning with multimedia resources (audio, video, ets.)?	100%	0	0	0	0	5.00
How well does Ibanify adapt to your individual learning pace?	80%	20%	0	0	0	4.80

Findings on Functionality of IBANIFY

Table 5 shows the results for functionality of IBANIFY. The functionality was assessed based on its ability to support vocabulary retention, grammar understanding, sentence construction, and practical language use. The platform performed exceptionally well in vocabulary learning, with a perfect mean score of 5.00 and 100% of respondents agreeing that it helped them remember Iban words effectively. Eighty-five percent strongly agreed that IBANIFY also improved their grammar comprehension and ability to apply the language in real-life contexts. The sentence construction module received a high rating of 4.70, demonstrating its effectiveness in guiding structured language learning. Gamification features such as interactive quizzes, progress tracking, and immediate feedback, which further reinforced learning and motivation. These results confirm that IBANIFY is a well-functioning digital tool that effectively enhances multiple aspects of Iban language acquisition.

Table 4. Feasibility of IBANIFY

Item	Percentage Scale (%)					Mean
	5	4	3	2	1	
How well does Ibanify help you learn and remember Iban vocabulary?	100%	0	0	0	0	5.00
How well does Ibanify assist you in understanding Iban grammar?	85%	15%	0	0	0	4.85
How well does Ibanify facilitate your ability to form sentences in Iban?	70%	30%	0	0	0	4.70
How well does Ibanify help you apply Iban language skills in practical situations?	85%	15%	0	0	0	4.85

Overall Findings

The development of IBANIFY successfully met its objectives by creating an interactive, web-based platform that enhances Iban language learning through literature exploration. The platform combines

multimedia resources, voice recognition, and cultural content with gamification elements such as interactive quizzes, badges, and progress tracking, which aims to provide an engaging and motivating learning experience. Evaluation results showed high user acceptance in terms of usability, feasibility, and functionality, confirming its effectiveness in teaching Iban vocabulary, grammar, and sentence construction.

Some limitations were identified, including the need for more visual content in lessons, a fully integrated progress-tracking system, and improved mobile accessibility. Addressing these areas in future updates will further enhance IBANIFY as a comprehensive and gamified learning tool. Planned enhancements include expanding the vocabulary database, adding images to lesson content, introducing new interactive quiz formats, optimizing the platform for mobile devices, and implementing a robust progress-tracking system to motivate continued learning.

Future research should also include feedback from non-Iban learners and incorporate qualitative methods to gain deeper insights into user experiences. Overall, IBANIFY represents a significant step in preserving and promoting the Iban language through digital innovation, providing a modern, interactive, and gamified approach to indigenous language education.

CONCLUSION

This study summarized the development and evaluation of IBANIFY, an interactive, web-based platform designed to support Iban language learning through literature exploration. The platform successfully achieved its objectives by providing an engaging, gamified learning environment that combines multimedia resources, cultural content, voice recognition, and interactive quizzes to enhance vocabulary, grammar, and sentence construction.

The evaluation highlighted several strengths, including high usability, effective learning support, and strong user engagement, while also identifying areas for improvement, such as expanding content, adding more interactive visuals, enhancing mobile accessibility, and implementing a progress-tracking system. Addressing these aspects in future updates will further strengthen the platform's motivational and educational impact.

Overall, IBANIFY represents a significant step in preserving and promoting the Iban language through digital innovation. By integrating gamification and interactive design, it provides a modern and effective approach to indigenous language education. The study also offers a reference for future research and development of digital platforms aimed at supporting minority and indigenous languages.

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CONFLICT OF INTEREST
The authors declare no conflicts of interest.

AUTHORS CONTRIBUTION
Author 1: Designed, developed, and implemented the IBANIFY study, including conducting the user testing, and prepared the initial draft of the manuscript. **Author 2**: Supervised the entire research process and provided guidance in the development of the study and manuscript preparation.

AVAILABILITY OF DATA AND MATERIALS
The datasets analysed during the current study are available within this article and its supplementary materials.

DECLARATION OF GENERATIVE AI

The authors declare that ChatGPT, a generative AI tool, was used to assist with language refinement and editing of the manuscript. All research concepts, data collection, interpretation, and analyses are the original work of the authors.

ETHIC STATEMENTS

This study received ethical approval from the Universiti Pendidikan Sultan Idris Research Ethics Committee. All research procedures were conducted in accordance with established ethical standards for studies involving digital learning platforms and the use of cultural content. Participants provided informed consent prior to their involvement in the study.

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