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Revolutionizing Primary School History Subject through the Development of an AI-Powered Quizizz Module

Nur Alia Syazreen Kamarol Idzham[1], Norshahila Ibrahim[2]*, Putri Taqwa Prasetyaningrum[3], Mimi Dalina Ibrahim[4]

[1,2]Faculty of Computing and Meta-Technology, Universiti Pendidikan Sultan Idris, Tanjong Malim, Perak, Malaysia.

[3]Faculty of Information Technology, Universitas Mercu Buana Yogyakarta, Indonesia

[4]Kolej Poly-Tech Mara Batu Pahat, Malaysia

ABSTRACT: The integration of Artificial Intelligence (AI) in education has transformed the landscape of teaching and learning by enabling automation, personalization, and adaptive learning experiences. However, teaching the History subject in primary schools continues to face challenges including low student engagement, difficulty in content retention, and limited use of interactive teaching materials. Existing platforms like Quizizz promote engagement through gamification but lack intelligent features that can automatically generate adaptive, curriculum-based questions. This study aimed to develop and evaluate an AI-powered Quizizz module designed to support History teachers in creating interactive and adaptive quizzes aligned with primary school curriculum. The research employed the ADDIE instructional design model, encompassing analysis, design, development, implementation, and evaluation phases. During the evaluation phase, content and interface validity were assessed by three History teachers and three multimedia lecturers, respectively. For effectiveness testing, 30 primary school History teachers participated in a pre-test and post-test design using a five-point Likert scale. Data were analyzed using a paired sample t-test to compare teachers' perceptions before and after using the module. Results showed significant improvements across all four dimensions: perceived effectiveness, content quality, student engagement, and teaching support ($p < .001$). The findings indicate that the AI-powered Quizizz module effectively enhanced teaching quality, increased student motivation, and reduced teachers' workload in quiz preparation. The study concludes that integrating AI features within gamified learning platforms can revolutionize History education by promoting interactive, data-driven learning environments. Future work should involve large-scale testing with students to measure learning outcomes directly and the integration of advanced AI features such as automated feedback, question difficulty prediction, and performance analytics to further enhance adaptive learning.

Corresponding Author:
Norshahila Ibrahim

KEYWORDS:
AI-Powered, History subject, Quizziz Modules, digital learning

1. INTRODUCTION

In recent years, the integration of technology in education has significantly transformed teaching and learning processes across various levels of education. Primary education serves as the foundation for students' cognitive, emotional, and social development. Among the core subjects, History plays a crucial role in fostering national identity, cultural understanding, and critical thinking (Lim et al., 2023; Michael et al., 2022). However, teaching History at the primary school level often faces challenges including low student engagement, difficulty in content retention, and limited use of interactive learning materials (Michael et al., 2022). Traditional methods for example lectures, textbook-based instruction, and rote memorization frequently fail to capture students' interest or to promote meaningful understanding of historical events and figures.

The rise of gamified learning platforms, like Quizziz, has introduced innovative ways to enhance learning motivation and participation (Lestari et al., 2022; Permana et al., 2023). These platforms allow teachers to create interactive quizzes that make learning more dynamic, competitive, and fun. However, while Quizziz provides valuable features for engagement, most existing quizzes rely heavily on manual question creation and lack adaptive intelligence that responds to individual learners' needs.

Consequently, teachers must spend substantial time designing and customizing quizzes to align with curriculum objectives, learning standards, and student ability levels.

With the rapid advancement of Artificial Intelligence (AI) technologies, particularly in Natural Language Processing (NLP) and Machine Learning (ML), there is great potential to automate and personalize digital learning content. AI-powered systems can analyze learning materials, generate quiz questions based on content difficulty, and provide adaptive feedback to enhance comprehension. When integrated into platforms like Quizziz, such technology can assist teachers in generating high-quality, curriculum-aligned questions efficiently while supporting differentiated learning among students (Permana et al., 2023).

Despite the growing adoption of digital learning tools, there remains a lack of intelligent quiz generation systems tailored specifically for the History subject in primary schools. Teachers often struggle with limited time and technical expertise to develop engaging, age-appropriate, and pedagogically sound quizzes. Current quiz modules are static and non-adaptive, offering little insight into individual student progress or comprehension gaps. This limitation results in inconsistent assessment quality and missed opportunities to reinforce historical concepts through interactive learning. Therefore, there is a pressing need to develop an AI-powered Quizziz module that can assist teachers in creating adaptive, curriculum-based History quizzes. Such a system should automatically generate diverse question types including multiple-choice, true or false, and sequencing, adjust question difficulty according to student performance, and provide analytical feedback to both teachers and students. This innovation aims to revolutionize History learning in primary education by making it more interactive, personalized, and data-driven.

This paper aims to:

1. To identify the needs and perspectives of teachers on teaching materials for History subject that using AI-generated questions tools.
2. To develop module for AI-generated questions tools (Quizizz).
3. To evaluate the usability of content and interface of the developed module.
4. To evaluate the effectiveness of the developed module among end users.

Artificial Intelligence in Education

AI has changed education direction-pavitized learning experiences, timeless assessments, and instant assessments are being delivered through skillfully supporting teaching and learning. Such platforms as Quizizz have AI offer multidimensional learning experiences to students, where they can quantify the learning gaps of every student, develop learning material according to their own requirements, and show performance results in real time. With this mechanism, educators greatly augment comprehension and retention by creating an engaging immersion learning environment. They found that AI applications demonstrate powerful activities within history learning, where they could conduct interactive scenarios and converge all multimedia components together to facilitate history course completion.

The Role of Quizziz in Education

Quizizz is a gamified learning platform that gets student engagement and motivation up this way; it turns assessment into active, collaborative games. There are extra aids-collaboration-supported assessment and analytical assessment-writing effective feedback for teachers-norjust for designing a learning environment. Some strategies in history education use the Quizizz platform to take complex subject knowledge and set a foundation for building chronological understanding so that students then develop empathy for historical events, themes, values, and processes. The game elements of such a platform transform the process of teaching into a big joy and are great in terms of allowing higher-order thinking and collaboration.

Implications for Primary School History Education

The teaching of history in elementary schools is being revolutionized by innovative technology like gamified learning and peel the AI. Platforms like Quizizz make learning history engaging and accessible through interactive quizzes, primary sources, and multimedia content. Such tools enhance critical thinking and empathy by connecting students to the core of historical narratives (Anggoro & Pratiwi, 2023). The impact of such tools would be more effective if the challenges of the digital divide, among others, are addressed in the professional development of teachers. The review of literature establishes AI and gamified products such as Quizizz to have the transformative potential that embraces inclusive, personalized, and engaging learning environments.

II. METHOD

This study used ADDIE model that sets the premise of designing a Quizizz platform with AI features for history education (Gagne et al., 2005). The systematic process of developing and implementing educational tools and resources is provided by the ADDIE model, which comprises analysis, design, development, implementation, and evaluation (Ibrahim et al., 2015, 2024). It guarantees a structured, powerful, and adaptable design of any module as per the requirements of teachers.

Analysis

To identify the needs and perspectives of teachers on teaching materials for History subject, an interview session had been conducted

with three teachers who had more than 5 years experiences in teaching History subject. Based on the interview, the most common teaching methods and practices that had been used in teaching History is by using the conventional methods including textbooks, printed timelines, videos, group project and role-playing activities. Teachers also mentioned that students are struggling with abstract or distant historical concepts including the retaining information unless it's visually appealing. Furthermore, students are more engaged when using digital tools in learning History subject. The teachers also mentioned about the limitation of availability of modern teaching aids in teaching and learning History in primary school students. In addition, there is lack of training for teachers in modern teaching approaches.

Design

Design involves planning the module content and its structure in a way that is easy for learners to understand and use. Among the most vital steps here are content writing, which includes identifying the main topics such as the features of the AI and the AI best performing ways. The design phase also implies designing a mood board and storyboard (Figure 1) for the module which will set up the visual aesthetics it will contain, while also ensuring that the exhibition is both attractive and simple to navigate. Moreover, the module structure has been intentionally designed to incorporate clear objectives, step-by-step instructions, and practical examples to help teachers use Quizizz effectively. The result is a modules framework that is designed and integrated both pedagogically and aesthetically.

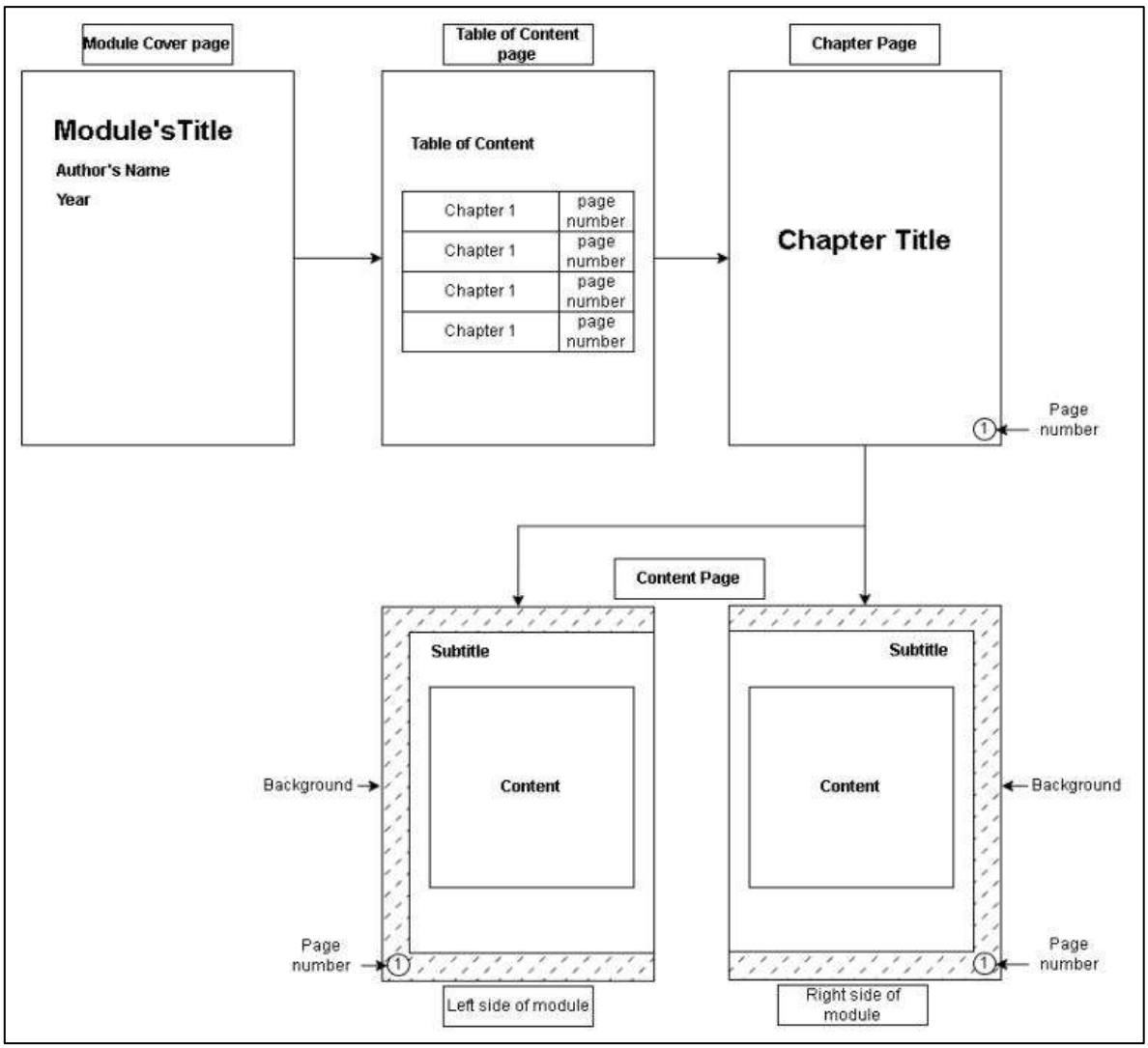

Figure 1: Storyboard of the Module

Development

This stage involves the design, organization, and improvement of the concepts of the module organized with clarity, engagement, and usability. The major tasks in this stage are organizing the contents based on key topics, such as Quizizz AI features and suggesting best practices for using them effectively. The visual design process encompasses creating a mood-board for the visual outlook of the module to make sure it is engaging and easy to navigate. Careful attention is given to planning structures that allow the modules to include learning outcomes, stepwise instructions, and examples to help teachers use Quizizz effectively. The outcome

is an effective and coherent design template or blueprint for the module to ensure that both pedagogical and design requirements are satisfied. Figure 2 shows screenshots of the Quizziz module.

Figure 2: Screenshots of Quizziz Module

Implementation

In an oriented setting, the module designed would be presented to the teachers for testing purposes. During this phase, three History teachers had been trained to use the modules with hands-on practice in creating and administering AI-powered quizzes on the Quizizz platform. The tutors then give their feedback on the potential and feasibility of this module in helping them improve their teaching practice. The outputs of this phase form invaluable insights regarding the modules, especially regarding their strengths and the areas where improvement is needed, by reason of their real-world application. Based on the feedback, iterative improvement is made to refine the module to ensure it meets the educational goals and user needs. As a result, a validated high-quality module had been produced and ready to be evaluate in terms of content and interface.

Evaluation

There are two activities involved in the evaluation phase including: (1) usability of the content and interface of the module, and (2) effectiveness of the developed module among end users. The objective of the testing is to ensure that the developed module not only functions as intended but also meets the practical needs of teachers and students in the primary school History classroom. For content validation, three history teachers were involved meanwhile for interface validation, three multimedia lecturers had been selected. These experts had been appointed based on their more than five years' experience respectively. Instrument for content validation was adapted from (Mohamad Tarmizi & Janan, 2022; Mohamed Abdelmohsen, 2020; Sintawati & Margunayasa, 2021) meanwhile instrument for interface validation was adapted from (Fatin et al., 2022). In content validation instrument, there are 5 sections including objective module, content module, format and language, presentation module and usefulness module. In the interface validation instrument, there are also 5 sections including multimedia elements, interactive design, ease of use, attraction, and clarity. The collected data had been analyzed using the descriptive analysis with the Likert scale rated from 1 (Strongly Disagree) to 5 (Strongly Agree).

For effectiveness testing, a total of 30 primary schools History teachers participated in the effectiveness testing. Using the purposive sampling technique, the participants were selected among the teachers who currently teach History subject, have more than 5 years teaching experiences, and familiar with the use of digital or online learning platforms including Quizziz, Kahoot or Google Classroom. The teachers were briefed on the objective of the testing and given a training session on how to use the module. The teachers completed a pre-test questionnaire. Then the teachers were asked to use the module for two consecutive weeks. After the implementation, the teachers completed a post-test questionnaire. Both pre-test and post-test questionnaire used Likert scale rated from 1 (Strongly Disagree) to 5 (Strongly Agree) measuring perceived effectiveness, content quality, student engagement, and teaching support provided by the module. A paired t-test was performed to compare teachers perceptions of teaching effectiveness before and after the use of the module. These testing will test the null hypothesis (H_0): There is no significant difference in teachers perceived teaching effectiveness before and after using the AI-powered Quizziz module.

III. RESULTS AND DISCUSSIONS

Three experts who are history teachers had been validated the content of the module. The evaluation included objective, content, format and language, presentation, and usefulness. As shown in Figure 3, the mean scores for each construct indicate a high level of agreement among the experts, as all mean values exceeded 4.85 on a 5-point scale.

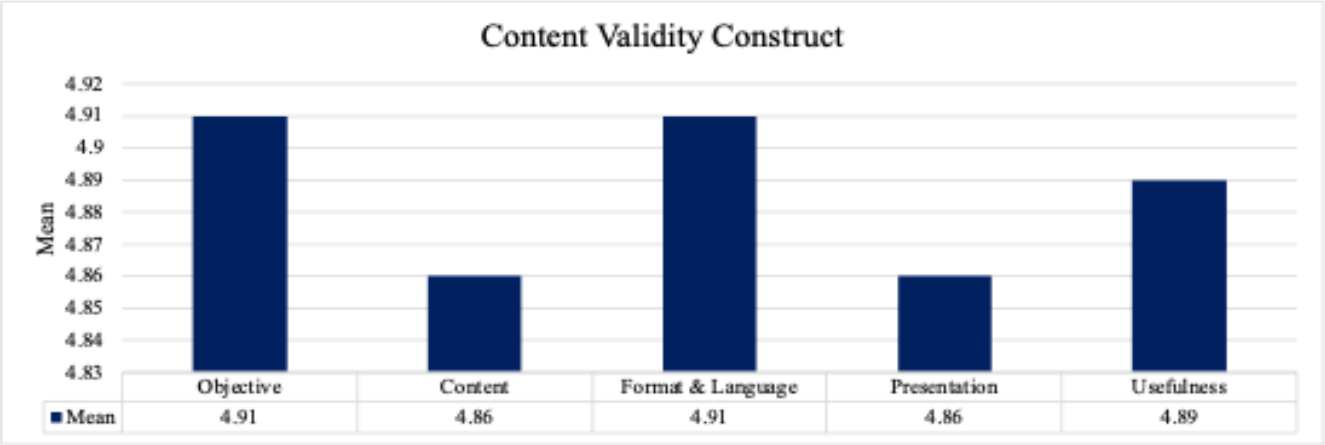

Figure 3: Mean Scores for Content Validity Construct

The module's objectives received the highest mean score of 4.91, indicating that there was consensus among the experts regarding clarity and relevance of the learning outcomes. This relationship also confirms previous findings that say well-defined objectives are fundamental in educational modules (Ellis et al., 2024). The construct for content gained a mean rating of 4.86, which indicated that the instructional material included in the module was appropriate and correlates quite well with the traditional curriculum. Prior studies, such as (Alfauzan & Tarchouna, 2017) emphasize that it is imperative that the curriculum be aligned for learners to achieve the students' intended outcomes.

With a score of 4.91, the module's language use and formatting are reflected in scores on these areas. Language and layout consistency has shown the potential to increase comprehension and engagement, as shown by (Filgona et al., 2020). Similar scoring to the Content at 4.86 shows that the presentation construct presents positive perceptions toward the visual and structural design of the module. Previous studies on the subject, for example (Hiver et al., 2024), pointed out the functions of 'presentation' in motivating and focusing learners. The usefulness construct scored 4.89, indicating that this module serves as a useful resource and gives ideas on how to apply AI concepts in historical contexts. Perceived usefulness is highly correlated to learners' intention to adopt and use educational tools. Such findings have shown that the AI model was given an enthusiastic reception by evaluators and proved to be relevant for educational purposes. High scores across all constructs would conform to earlier research and show the import of expert evaluation in developing high-quality educational materials. Future research might include testing of a model with students to see the model's ability to function in real classroom conditions.

In the other hand, three experts who are multimedia lecturers had been validated the interface of the module. The evaluation included multimedia elements, interactivity, ease of use, attraction, and clarity. Figure 4 shows the overall mean score for interface validity constructs. According to the outcomes, it can be inferred that all the constructs have been rated more than 4.0, indicating that there is consistency among the experts regarding the quality of the interface in general. The construct that gained the highest value of mean score was that of Attraction at 4.73, which signifies that the interface is perceived to be visually appealing and engaging. On the other hand, Interactivity received a mean score of 4.33, which is the lowest but still indicates a positive evaluation. Results were consistent with previous studies that underscored the need for the multimedia elements, interactivity, and usability in the design of effective learning interfaces (Mayer, 2005). The high score Multimedia Elements (4.58) shows that this module successfully incorporates appropriate visuals, audio, and other media into the learning experience.

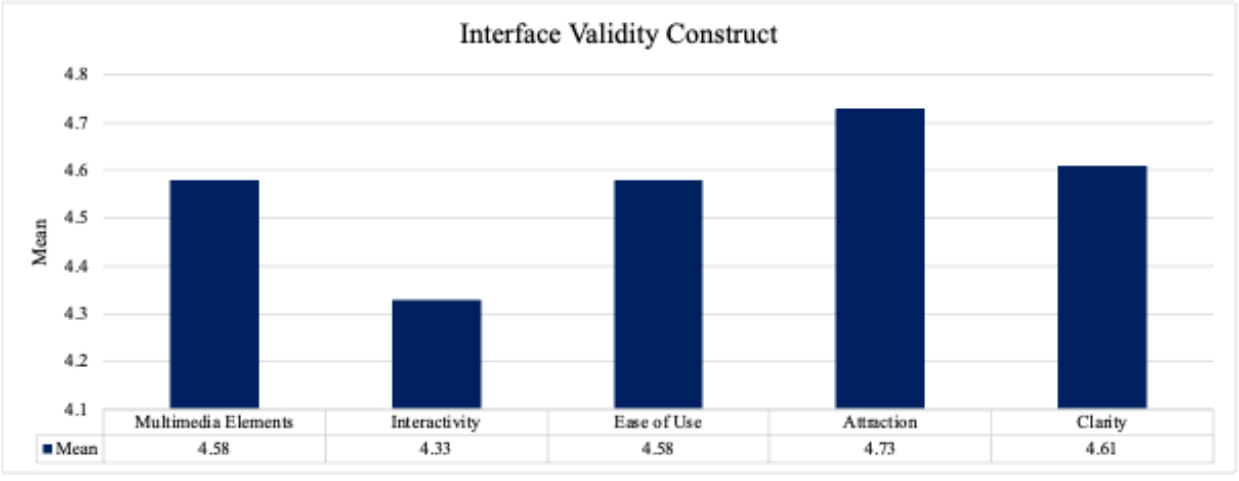

Figure 4: Mean Scores for Interface Validity Construct

Ease of Use, which also scored 4.58, is one of the critical parameters for an AI-based module to allow users to handle the system without mental fatigue. The above result was consistent with what Nielsen & Molich (1990) pointed out when he said that usability has been one of the basic determinants of interface effectiveness. Another parameter being Attraction, which attains the highest mean score, shows how important aesthetic value is in digital learning tools. The slightly lower score obtained on the dimension of Interactivity (4.33) reveals some space for improvement in making the AI module more interactive by/for its users. This also resonates with research results posited by Nielsen & Molich (1990), that interactivity is critical in ensuring active learning and participation by the users. Enhance adaptive feedback, interactive exercises, or gamification to cover that base. Overall, the expert remarks show that such findings support the validity of the interface of the AI module, excelling in interestingness, clarity, and usability. Improvement efforts in the future are directed towards maximizing interactivity and, thus, user engagement and learning outcomes.

The results of the paired sample t-test indicate significant improvements in all four measured dimensions after teachers implemented the AI-powered Quizziz module. Table 1 shows the results of paired t-test.

Table 1: Results of Paired t-test

Construct	Pre-Test Mean	SD	Post-Test Mean	SD	Mean Difference	p-value	Interpretation
Perceived Effectiveness	3.72	0.38	4.45	0.36	0.73	< .001	Significant Difference
Content Quality	3.80	0.41	4.52	0.40	0.72	< .001	Significant Difference
Student Engagement	3.70	0.39	4.50	0.33	0.80	< .001	Significant Difference
Teaching Support	3.68	0.43	4.38	0.42	0.70	< .001	Significant Difference

Based on Table 1, teachers rated their teaching effectiveness significantly higher after using the module ($p < .001$). This suggests that the module enhanced their instructional delivery and ability to engage students interactively. The AI-generated quiz questions were perceived as more relevant and accurate post-implementation ($p < .001$), showing that the system effectively aligned with curriculum standards. Teachers observed a significant rise in students' enthusiasm and participation during History lessons ($p < .001$), confirming the module's gamified and adaptive learning features improved motivation. There was also a significant increase in perceived teaching support ($p < .001$), indicating that the module reduced teachers' workload in quiz preparation and classroom assessment. Because all p-values were less than 0.05, the null hypotheses (H_0) for all four constructs were rejected. This demonstrates that the use of the AI-powered Quizziz module significantly improved teachers' perceptions of the effectiveness, content quality, student engagement, and teaching support in teaching primary school History. The results confirm that the developed AI-powered Quizziz module has a statistically significant positive effect on the teaching and learning process. Teachers reported that the integration of AI-generated quizzes made lessons more interactive and adaptive, allowing them to focus more on facilitating learning rather than manually creating assessments. These findings support the module's potential to revolutionize History education at the primary level through intelligent automation and engagement-driven learning.

IV. CONCLUSIONS

In this study, the researcher was able to show how AI can be implemented with Quizizz to create history lessons. Credibility bias revealed highest hits in areas such as content and interface validity, set objectives, ease of use and incorporation of multimedia. The teachers found it relevant, neat and easy to prepare the quizzes in a shorter period of time, which is suitable for the present education system. Overall, the content and interface validity of the module proved good, thus effective alignment with the educational goals was achieved. It met most of the user expectations, just with minor suggestions for improvement in clarity, interactivity, and layout for easier use and overall effectiveness. The feedback from the experts was beneficial to ensure that the module would meet higher educational standards and respond to the needs of teachers and learners. Nevertheless, some general positive disparity of question difficulty level revealed specific areas, which need improvement. Measured in terms of impact in schools, the module proved valuable by decreasing the teachers' burdens, increasing the array of students' interactions by gamification, and promoting critical thinking. Shortages were a small study population, focus on a specific area only, and a short period of study which prevented the study from sampling a larger population and gaining knowledge of the long-term outcomes. The limitations of the present work entail can be highlight the future studies consist of extending the study to different types of schools, larger sample size and a longer duration for the effects to manifest or not. These include the domain of history with applications in science, mathematical and language learning areas for the overall development of the artificial intelligence educational module.

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VII. DATA AVAILABILITY STATEMENT

Data available on request from the authors.

VIII. DISCLOSURE

All authors declare no conflicts of interest.

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