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JEJAK SEJARAH: A MOBILE APPLICATION ON MALAYSIAN HISTORY FOR FORM FOUR STUDENTS WITH INTERACTIVE NOTES AND MIND-MAP GENERATOR

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Abstract

The *"Jejak Sejarah"* mobile application was developed to enhance the learning experience of Malaysian history for Form Four students. The traditional methods of teaching history were often seen as monotonous, leading to reduced student engagement (Hassan & Mohamad, 2019). This study aimed to create an interactive learning tool incorporating gamification elements, quizzes, and a mind-map generator to improve learning outcomes. The development followed the ADDIE model, ensuring a systematic approach from analysis to evaluation (DeBell, 2020). The application provided chapter-based notes, interactive quizzes, and mind maps generated using Python and Graphviz (Xiao et al., 2023). The evaluation was conducted using the EGameFlow framework, measuring aspects such as concentration, goal clarity, feedback, and immersion (Fu, Su, & Yu, 2009). The results indicated that students found the application engaging and effective in enhancing their understanding of historical content. While some limitations were noted, such as incomplete syllabus coverage and lack of iOS support, future improvements could address these gaps. Overall, this project demonstrated the potential of mobile applications in making history learning more enjoyable and interactive for students.

Keywords: Mobile Learning, History Education, Interactive Learning, EGameFlow

INTRODUCTION

History is a compulsory subject in Malaysian secondary education, yet many students find it unengaging due to traditional teaching methods that rely heavily on memorization (Ministry of Education Malaysia, 2023). Research suggests that gamification can improve motivation and enhance learning outcomes (Bai et al., 2020; Bitrián et al., 2021). The purpose

of this study is to develop and evaluate *"Jejak Sejarah"* a mobile application that incorporates quizzes, multimedia, and mind maps to make history learning interactive and engaging.

Gamification techniques such as badges, leaderboards, and interactive challenges have been widely adopted in educational applications to increase motivation and learning engagement (McCarthy, 2021). *"Jejak Sejarah"* applies these principles within the Malaysian history curriculum, offering a structured, user-friendly learning experience designed to improve retention and comprehension.

The SPM Analysis Report (Ministry of Education, 2023) showed an increase in history scores from 2018 to 2023, but the improvement was not significant. The scores still did not consistently surpass 95%, suggesting that many students did not prioritize the subject, even though history was mandatory for certification. Figure 1.1 below shows the SPM Analysis Report for 2018 – 2023.

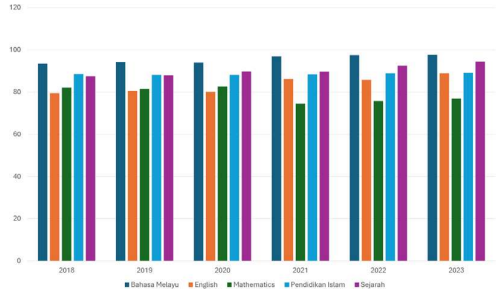

Figure 1.1: SPM Analysis Report for 2018 - 2023

The percentage of students passing history increased, but the number of failing students remained high. In 2023, more than 20,000 students failed the subject, which was a serious concern. Figure 1.2 below shows the total number of students who failed from 2018 to 2023, highlighting the need for better learning strategies to reduce failure rates.

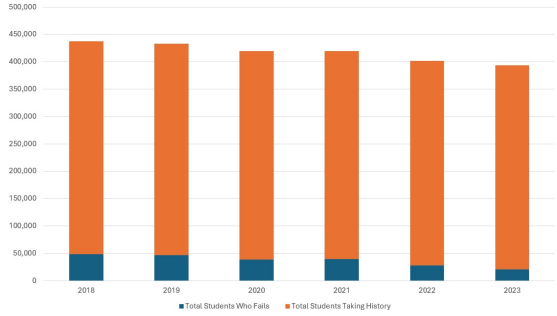

Figure 1.2: Total Students Taking History and Who Fails

The high failure rate in history required attention, as 20,869 students failed the subject in 2023 alone. This large number showed that historical education needed improvements to help more students succeed.

Problem Statement

History was an important subject in the Malaysian education system, but many students found it difficult and uninteresting due to traditional teaching methods that relied heavily on textbooks and memorization (Hassan & Mohamad, 2019). As a result, students often struggled to remember historical facts and lost interest in the subject (Jaafar & Mohd Noor, 2016). Some history learning applications provided interactive features, but many lacked structured learning paths, engaging activities, and effective revision tools (Bai et al., 2020). The absence of gamified elements in most history apps also reduced student motivation (Pakpour et al., 2021). Because of this, a new approach was needed to make history learning more interactive, engaging, and effective for students.

Objectives

The project was developed with the following objectives:

1. To design an enjoyable mobile application for learning history.
2. To develop a mobile application based on the design of objective in 1.
3. To evaluate the usability and enjoyment of mobile applications in learning history.

Scope

This study focused on the development and evaluation of the *"Jejak Sejarah"* mobile application, which was designed for secondary school students studying Form Four Malaysian history. The app included interactive quizzes, structured notes, and mind maps to help students understand historical topics. The content followed the Malaysian school syllabus, ensuring its relevance to students' education. The app was tested for usability, engagement, and learning effectiveness based on student feedback and evaluation models such as EGameFlow.

Study Significance

This study aimed to improve the learning experience of history students by providing an interactive and engaging alternative to traditional learning methods. By integrating gamification elements, the app encouraged students to actively participate in learning rather

than relying on memorization. The findings of this study provided insights into how mobile applications improved history education and served as a reference for future educational app development. Educators could also use this research to apply better teaching strategies using digital tools to make history lessons more enjoyable and accessible.

LITERATURE REVIEW

This part represents the literature review section. It serves as a key section in a manuscript, summarizing past research and relevant studies that support the current work.

History Education

History became a required subject in Malaysia in 1989. However, many students found it boring and difficult to remember because lessons were mostly based on reading textbooks and memorizing facts. Research showed that students learned better when lessons were interactive and enjoyable**.** One way to make history more fun was by using gamification**,** which meant adding points, badges, and quizzes to learning. These features made students more excited to study and helped them stay focused. Studies found that when students played educational games, they remembered information better and enjoyed learning more (Bai et al., 2020).

Effective Learning Methods

The Effective Learning Methods subchapter explained different ways to help students understand and remember lessons better. It focused on interactive slides and concept maps, which made learning more fun and easier to follow. These methods helped students stay focused, take part in lessons, and remember important information for a longer time.

Interactive Slides

Interactive slides used animations, quizzes, and videos to explain topics in a way that caught students' attention. Research showed that students who used interactive slides were more engaged and interested in learning. The slides also helped students stay focused and understand lessons more easily (Pakpour et al., 2021).

Concept Maps

Concept maps helped students organize and connect ideas visually. Instead of memorizing long paragraphs, students could see how different historical events were related. Studies found that students who used concept maps did better in history tests because they understood the topics more clearly (Izci & Akkoc, 2023).

Summary of the Effective Learning Method

Interactive slides use animations, quizzes, and videos to make learning more interesting and enjoyable. They helped students stay focused, understand lessons better, and remember information for a longer time. By making topics more engaging, interactive slides improved learning and made it easier for students to pay attention. Table 2.1 below shows the comparison between effective learning methods, which were interactive slides and concept maps.

Table 2.1 Comparison of Interactive Slides and Concept Maps

Learning Method	Description	Benefits
Interactive Slides	Used animations, quizzes, and videos to explain topics and capture students' attention.	Helped students stay engaged, and focused, and understand lessons more easily (Pakpour et al., 2021).
Concept Maps	Helped students organize and connect ideas visually by showing relationships between historical events.	Improved understanding and test performance by making information easier to remember (Izci & Akkoc, 2023).

Development Frameworks

Creating a good mobile learning app required a clear plan, and the ADDIE model was commonly used because it had five simple steps. First, the Analyze step identified what students needed to learn. Next, the Design step planned the app's structure and features. Then, the Develop step focused on building the app. After that, the Implement step tested and launched the app for users. Finally, the Evaluate step checked if the app met learning goals and worked well for students. Compared to other models, such as the Software Development Life Cycle (SDLC) and Mobile Application Development Life Cycle (MADLC), the ADDIE model was better for educational apps because it focused on making learning more effective (DeBell, 2020). Figure 2.1 shows the ADDIE model. Figure 3 below shows the ADDIE model.

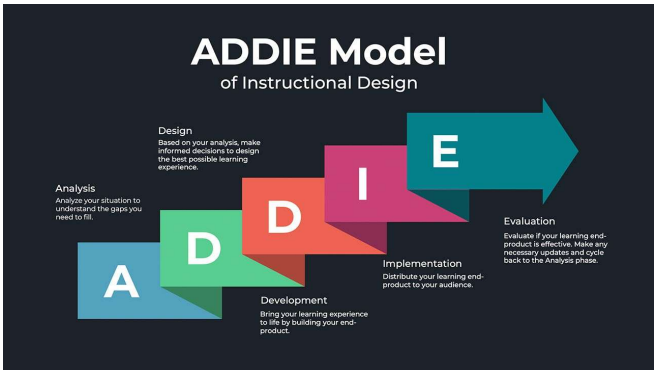

Figure 2.1: Analysis, Design, Development, Implementation and Evaluation (ADDIE) Model

Existing Apps

Several history learning apps were available, but they had some limitations. History Game used quizzes and points to make learning more fun and engaging. *"Sejarah Tingkatan 4"* combined quizzes with short notes, which helped students review important historical facts more easily. *"Sejarah Tahun 5"* was designed like a mini-game with cartoons and sound effects, making history lessons more enjoyable, especially for younger students. Even though these apps made learning more interactive, they did not have interactive mind maps or structured learning paths, which could have helped students understand historical events and their connections more clearly. Table 2.2 below shows the comparison of existing applications.

Table 2.2: Comparison of Existing Applications

App Name	Features	Limitations
History Game	Quizzes and points system for engagement	No structured learning paths
Sejarah Tingkatan 4	Quizzes with short notes for reviewing history	Lacks interactive mind maps
Sejarah Tahun 5	Mini game with cartoons and sound effects for young learners	Does not provide deep historical connections

Evaluation Methods

The Evaluation Methods for Gamified Learning subchapter explained how to measure the effectiveness of learning apps that used game-like features. It focused on methods such as EGameFlow, which checked if students enjoyed learning, and the Game Experience Questionnaire (GEQ), which measured their emotions while playing. These methods helped determine if gamified learning kept students engaged and improved their understanding of the subject.

EGameFlow

To check if an educational app was fun and effective, evaluation tests were needed. EGameFlow was one of the most commonly used methods to measure how much students enjoyed learning. It focused on several important aspects, including concentration, goal clarity, feedback, challenge, immersion, and knowledge improvement (Fu et al., 2009). These factors helped researchers understand whether an app made learning engaging and if students stayed interested in the subject.

Game Experience Questionnaire (GEQ)

The Game Experience Questionnaire (GEQ) was another evaluation method that measured how players felt while using a game. It focused on emotions, enjoyment, and how immersive the game experience was. However, GEQ was better suited for entertainment games rather than educational ones, as it did not specifically assess learning effectiveness (Poels et al., 2007).

Summary of Evaluation Method

Among these methods, EGameFlow was the best choice for evaluating a history learning app because it focused on both learning and engagement. It provided useful insights into whether students were enjoying the app while also improving their knowledge, making it a more suitable tool for educational purposes. Table 2.3 below shows the comparison of evaluation methods.

Table 2.3 Comparison of Evaluation Methods

Evaluation Method	Purpose	Best For	Key Factors Measured
EGameFlow	Check if an app makes learning fun and engaging	Educational games	Concentration, goal clarity, feedback, challenge, immersion, knowledge improvement
Game Experience Questionnaire (GEQ)	Measures emotions and feelings while playing	Entertainment games	Enjoyment, immersion, emotional responses

Since EGameFlow focused on learning and student engagement, it was the best option for evaluating a history learning app.

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METHODOLOGY

This study followed a step-by-step process to develop a history-learning mobile application. The ADDIE model was chosen as the main framework because it provided a clear structure with five phases: Analysis, Design, Development, Implementation, and Evaluation. This approach ensured that the app met educational needs, kept students engaged, and improved learning outcomes.

Phase 1: Analysis

The analysis phase identified problems students faced while learning history, such as lack of interest and difficulty remembering facts. Many history-learning apps were reviewed to understand their strengths and weaknesses. Surveys and feedback were collected to learn about students' learning habits, challenges, and motivation levels. The findings helped in designing an app that made history lessons more interactive and enjoyable.

Phase 2: Design

The design phase focused on planning the app's layout, features, and user experience to make learning history more engaging. Several important elements were included to improve learning. Interactive quizzes were added to help students remember historical facts more effectively. Animations and images were used to make lessons more visually appealing and interesting. Mind maps were included to show connections between historical events, making it easier to understand how different events were related. To ensure the app was well-structured and easy to use, a wireframe and storyboard were created to map out how each feature would function.

Phase 3: Development

On the Insert tab, the galleries include items that are designed to coordinate with the overall look of your document. You can use these galleries to insert tables, headers, footers, lists, cover pages, and other document building blocks. When you create pictures, charts, or diagrams, they also coordinate with your current document look.

Phase 4: Implementation

The development phase involved building the app using Flutter, allowing it to work on both Android and iOS devices. The process started with creating the user interface, ensuring that navigation was smooth, and the design was visually appealing. At the same time, a back-end system was developed to manage quizzes, track user progress, and store content securely. Firebase was integrated into the app to provide secure data storage for users and learning materials. Throughout development, regular testing was conducted to fix errors and improve performance. This helped ensure that the app functioned smoothly, providing a user-friendly and effective learning experience for students.

Phase 5: Evaluation

The app's effectiveness was measured using EGameFlow, which looked at engagement, goal clarity, feedback, and knowledge improvement. A pre-test and post-test method was used to compare students' knowledge before and after using the app. Surveys were also conducted to understand whether the app made history lessons more interesting and easier to learn.

Flowchart for Proposed Project

The flowchart showed how the *"Jejak Sejarah"* mobile application worked and guided users through different sections. The process began when the app was opened, leading to the login screen. If the login was successful, the homepage appeared with four main options: *"Belajar"* (Learn), *"Kuiz"* (Quiz), *"Buku Teks Tingkatan"* 4 (Form 4 Textbook), and Setting. If the login failed, the user was directed to the registration page and had to register before trying again

The learning module (*"Belajar"*) displayed a list of history chapters. After selecting a chapter, a content page appeared, allowing access to mind maps (*"Jana Peta Minda"*) and important notes (*"Nota"*). The quiz module (*"Kuiz"*) allowed users to complete quizzes based on selected history chapters. Once a quiz was completed, the score page appeared before returning to the homepage. The textbook module (*"Buku Teks Tingkatan 4"*) provided access to history textbook content.

The settings module (Setting) included four options: Informasi, which showed details about the app; Google Form, which opened a browser for additional feedback; *"Log Keluar"*, which logged out the user and returned to the login screen; and Exit, which closed the

application. The flowchart ensured smooth navigation, making history learning more interactive and engaging with quizzes, mind maps, and study notes. By following a structured process, the app helped students learn in a simple and enjoyable way. Figure 3.1 below shows the flowchart of the proposed project.

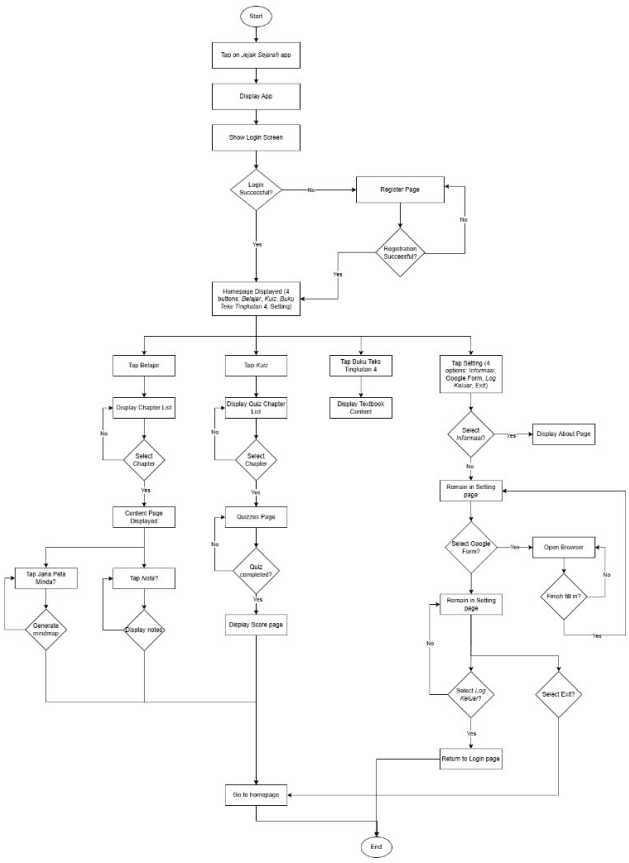

Figure 3.1: Flowchart of Proposed Project

To change the overall look of your document, choose new Theme elements on the Page Layout tab. To change the looks available in the Quick Style gallery, use the Change Current Quick Style Set command. Both the Themes gallery and the Quick Styles gallery provide reset commands so that you can always restore the look of your document to the original contained in your current template.

RESULT AND DISCUSSION

This section presented the findings of the study and explained how the *"Jejak Sejarah"* mobile application helped improve history learning. The evaluation focused on student engagement, memory improvement, and overall user experience. The results were gathered

through pre-test and post-test comparisons, student feedback, and the EGameFlow evaluation model.

Evaluation of Learning Effectiveness

Students who used the *"Jejak Sejarah"* app found history learning more interesting and easier to understand. Many said that mind maps helped them see how historical events were connected, making it easier to remember important facts. The interactive slides and quizzes made lessons more enjoyable and encouraged them to stay focused. Feedback showed that the combination of games, visual aids, and quizzes kept students motivated and engaged while learning history. These findings supported earlier studies, which suggested that interactive learning tools helped students understand and remember lessons better.

User Engagement and Experience

The *"Jejak Sejarah"* app was evaluated using the EGameFlow model, which measured engagement, goal clarity, feedback, challenge, and immersion. Students showed greater interest and motivation when using the app compared to reading textbooks. The app provided clear instructions and well-organized lessons, making it easier to follow and understand historical topics. Immediate feedback after quizzes helped students recognize mistakes and improve their learning. The quiz difficulty was well-balanced, ensuring that questions were not too easy or too difficult. This helped students stay focused and engaged, making history learning more interactive and effective. Figure 4.1 below shows the results of EGameFlow after the evaluation.

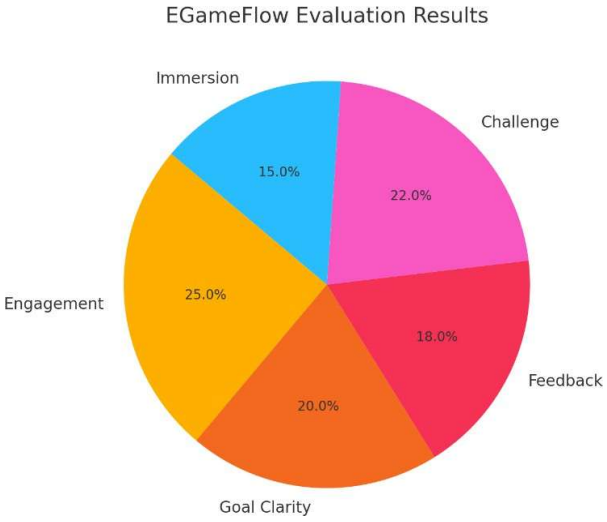

Figure 5: EGameFlow Results

CONCLUSION

The *"Jejak Sejarah"* app made history learning more engaging and easier to understand by using quizzes, mind maps, and study notes. While some challenges were found, the app showed great potential to improve history education with further improvements.

Summary of Findings

The *"Jejak Sejarah"* mobile application was created to make learning Malaysian history more interactive and engaging. By including quizzes, mind maps, and structured content, the app provided a new way of learning compared to traditional textbooks. The ADDIE model was used to ensure the app was well-planned and effective. The results showed that students found the app useful, enjoyable, and easy to navigate. The EGameFlow evaluation confirmed that the app performed well in engagement, goal clarity, feedback, challenge, and immersion, proving that it created a better learning experience. Positive feedback from students showed that the app made history learning more enjoyable and fun increasing their interest in the subject.

Limitations

Even though the app had good results, some challenges were found. The app needed an internet connection, which made it difficult to use in areas with poor connectivity. The content was limited because it only covered the Form Four syllabus, and some chapters were missing

notes. The quiz database had only a small number of questions, which might cause students to lose interest over time. There was also no password reset feature, making it hard for students who forgot their login details to access their accounts. Another issue was the lack of iOS compatibility, which meant students using Apple devices could not use the app.

Recommendations

Some improvements could make the app even better. Adding offline access would allow students to study without needing an internet connection. Expanding the quiz database and adding different question levels would make learning more interesting and engaging. A password reset feature should be included to help students recover their accounts if needed. Making the app compatible with iOS devices would allow more students to access it. Additionally, adding past-year SPM exam papers would help students prepare better for exams. Future updates could also include a ranking system or leaderboard to encourage friendly competition and motivation.

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