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Evaluating Learning Engagement in *MyPerjuangan* Game-Based Learning Using E-Game Flow: A Case Study of History Education in Malaysia

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Abstract: Passing the History subject in Malaysia is compulsory for students who want to receive the Sijil Pelajaran Malaysia (SPM) certificate. Traditional teaching methods, often focused on rote memorization, have led to disengagement and low enjoyment among students. This research addresses the need for improved learning engagement and information management by developing *MyPerjuangan*, a game-based learning platform focusing on Malaya's Japanese occupation. The aim is to evaluate the effectiveness of game-based learning in managing educational content and enhancing student engagement in history education. The study developed the platform using the Game Development Life Cycle (GDLC) methodology. It employed the E-Game Flow model to evaluate user experience across several dimensions: concentration, feedback, goal clarity, and knowledge improvement. Data were collected through a survey of 10 respondents, consisting of teachers and students, with an overall satisfaction rate of 94.3%. The mean values for key factors such as concentration (92%) and knowledge improvement (100%) indicate high levels of engagement and effective information management within the platform. These findings suggest that *MyPerjuangan* successfully manages and delivers historical information engagingly, significantly improving students' interaction with the material. However, limitations such as the small sample size and the platform's exclusivity to desktop use were identified. Future research should expand the study to a larger, more diverse sample and explore multi-platform accessibility to enhance the system's scalability. In conclusion, game-based learning is valuable for improving educational content management and student engagement in history education.

Keywords: *Game-Based Learning, History Education, Student Engagement, E-Game Flow Model, Knowledge Improvement*

1. Introduction

In Malaysia, the Ministry of Education has mandated that students pass the History subject to obtain the Sijil Pelajaran Malaysia (SPM) certificate (Ministry of Education, 2021). Failure to meet this requirement prevents students from receiving their certification, which can have long-lasting consequences for their academic and professional futures. In the 2021 SPM examination, 11.91% of candidates—45,514 students—failed to pass either the History or Bahasa Melayu paper, making them ineligible for certification (Selangor Journal, 2022). Given the importance of history as a core subject, the high failure rate highlights a need for reform in how the subject is taught, particularly in addressing student disengagement with traditional methods.

The conventional approach to teaching history, which primarily relies on lectures, textbook reading, and memorization, has been cited as a significant factor contributing to students' lack of interest. Baderi et al. (2019) emphasize that these methods fail to stimulate active engagement and are perceived as monotonous by students. Studies have shown that students often find history dull and unrelatable, particularly when lessons emphasize rote memorization over interactive learning. Hassan and Mohammad (2019) propose that integrating technology through interactive, game-based learning platforms can provide a more engaging alternative. Game-based learning aligns with current educational trends promoting active participation, problem-solving, and immersive experiences, making history more enjoyable and accessible to students.

Current teaching methods in Malaysian secondary schools rely heavily on traditional approaches, such as lectures and textbooks, which have been found to limit student engagement with historical content (Talin & Kiamsin, 2018). These methods often focus on rote memorization, failing to capture students' interest and hindering their ability to connect with and appreciate the subject matter. Surveys conducted among secondary school students revealed that while many are interested in history, traditional teaching styles' repetitive and

unengaging nature results in low motivation and enjoyment. This poses a significant barrier to effective history education, as students struggle to retain knowledge and engage meaningfully with the material.

Furthermore, the lack of diverse instructional strategies that incorporate interactive and entertainment elements exacerbates the issue of disengagement (Diyana, 2023). Without more dynamic, student-centered teaching methods, history lessons remain static and unappealing, limiting students' understanding and retention of key historical events. To address these challenges, there is a clear need for innovative educational approaches that can stimulate student interest, particularly using game-based learning models that integrate interactivity, engagement, and real-time feedback.

2. Literature Review

A. History Education in Malaysia

Passing the History subject in Malaysia is mandatory to obtain the *Sijil Pelajaran Malaysia* (SPM) certificate (Ministry of Education, 2021). Failing this subject can significantly limit students' educational and career prospects. In 2021, 10.4% of candidates failed History, with a *Gred Purata Mata Pelajaran* (GPMP) score of 4.88, reflecting students' difficulties in mastering the subject. The SPM History syllabus encompasses various topics, including the Japanese occupation of Malaya and the development of Malaysia's constitutional framework. Although these topics are important for understanding national identity, many students find them challenging and disengaging (Ridzuan et al., 2020).

Research by Rashadi and Ahmad (2019) shows that students struggle with historical content due to a limited understanding of key events. Akengin and Cendek (2017) found that students often view history as disconnected from their present, diminishing their interest. Seman (2019) demonstrated that integrative teaching methods significantly improved student engagement. These studies highlight the need for innovative methods like game-based learning to improve student engagement and comprehension. By introducing interactive elements, history lessons can become more relevant, engaging, and enjoyable, leading to better learning outcomes.

B. Learning Engagement through Game-Based Learning (GBL)

This study explores the implementation of Game-Based Learning (GBL) in *MyPerjuangan*, a history-focused educational platform for Malaysian secondary school students, aimed at improving student engagement and learning outcomes. The evolution of Malaysia's education system has underscored the need for innovative teaching approaches that promote greater student involvement in history lessons. GBL integrates educational content with interactive game elements, encouraging active learning, critical thinking, and collaborative problem-solving (Dimitra et al., 2020).

Research has consistently shown that GBL positively impacts student attitudes, fostering greater engagement and academic achievement. Incorporating elements such as role-playing, competition, and collaboration within the learning process has been demonstrated to heighten motivation and performance (Pratama & Setyaningrum, 2018). *MyPerjuangan* adopts these principles, creating an immersive, interactive experience that aligns with modern educational strategies. The study applies the E-Game Flow model to assess crucial factors like concentration, feedback, and goal clarity, offering valuable insights into how GBL enhances both engagement and educational outcomes.

Compared to traditional methods, GBL provides a more engaging and dynamic learning environment, making historical topics more accessible and engaging for students. By leveraging GBL in the history curriculum, the study highlights its capacity to significantly improve students' interaction with the subject, leading to better retention of knowledge and overall academic success.

C. Enhancing Engagement with Game Elements

Elements of the Game-Based Learning Model: Game-Based Learning (GBL) incorporates various game elements to create an engaging and interactive educational environment. Key elements identified in the design model include challenges, badges, clear goals, feedback, exploration, and narrative (Aina Nadhirah & Mimi Hani, 2020). These elements provide structure and motivation, ensuring students remain focused while learning

through gameplay. Players receive immediate feedback and rewards, which enhance their engagement and enjoyment.

Advantages of Game-Based Learning: GBL offers several advantages, including fostering critical thinking, problem-solving, and collaborative skills. It enhances academic performance and engagement by making learning more interactive and motivating (Dimitra et al., 2020). Studies by Tavares Nuno (2022) and Kusuma et al. (2021) demonstrate that mobile and desktop games significantly improve learning outcomes. GBL's interactive and competitive elements, such as leaderboards and rewards, provide further incentives for students to stay engaged and achieve higher goals.

Types of Games: GBL utilizes various games, including serious games, educational games, and simulators (Pappas, 2023). Serious games are designed to deliver educational content with clear learning objectives, while gamified learning adds elements like badges and leaderboards to enhance engagement. Simulators offer realistic, hands-on experiences where students can practice skills and make decisions in controlled virtual environments.

Game Elements: Key game elements such as levels, scores, progress tracking, and rewards are critical in maintaining student motivation. Learners advance through levels of increasing difficulty, receive immediate feedback, and earn rewards like badges, which incentivize ongoing participation and achievement (Durin et al., 2018).
This model ensures that GBL is an effective tool for enhancing engagement and learning outcomes.

D. Example of Related Applications
Several game-based learning applications have effectively integrated historical content to engage learners.

"Through the Darkest of Times" (Paintbucket Games, 2020) immerses players in the resistance movements of the Nazi regime, allowing them to make decisions and face moral dilemmas. This approach fosters critical thinking and empathy while exploring historical events, making it a valuable educational tool.

"Mission US" (Mission US, 2023) offers an interactive way to learn American history by placing players as historical figures. The game uses storytelling and decision-making to help students understand the consequences of their actions within historical contexts. Its emphasis on primary documents and historical accuracy further enhances students' critical thinking.

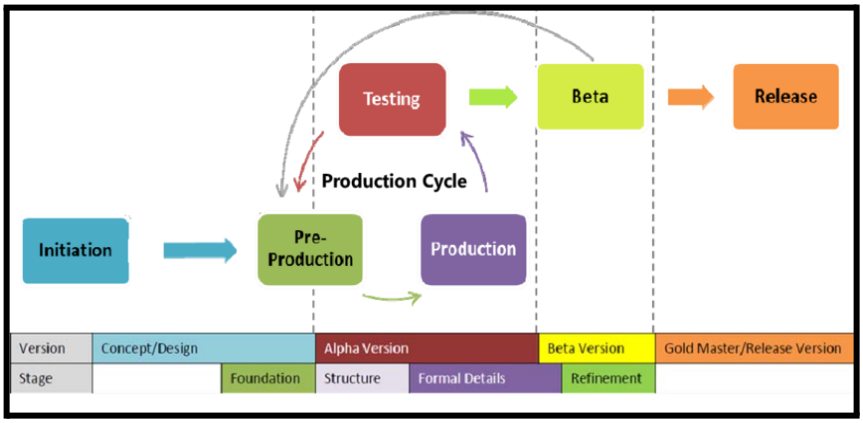
Lastly, **"Valiant Hearts: The Great War"** (Ubisoft Montpellier, 2014) combines narrative-driven gameplay with puzzle-solving to teach players about World War I. By incorporating real historical events and artifacts, the game offers an emotionally engaging learning experience that deepens players' understanding of the war's human impact.

These examples illustrate how game-based learning can blend historical content with interactive elements, making history more engaging and enhancing learning outcomes.

3. Methodology

GDLC Methodology The Game Development Life Cycle (GDLC) methodology is employed in this project to guide the development of the *MyPerjuangan* game-based learning application. As shown in Figure 1, the GDLC consists of six key phases: initiation, pre-production, production, testing, beta, and release (Ramadan & Widyani, 2013). Each phase is critical in ensuring a structured and iterative development process. During the **initiation phase**, the game concept is developed through comprehensive research, which involves gathering historical and educational content and conducting a survey to understand the target audience's needs. The **pre-production phase** focuses on game design by documenting game mechanics, flowcharts, and hardware requirements. In contrast, the **production phase** involves creating assets, integrating codes, and developing the game using Unity software. **Testing** includes alpha testing to identify bugs and functionality issues. In the **beta phase**, feedback from teachers and students at SMK Kangkar Pulai is collected to refine the game before its final **release**, which will occur at the school.

Figure 1: Phases of GDLC



Preliminary survey analysis

The survey conducted among students and teachers at SMK Kangkar Pulai provides crucial insights into the target audience's preferences and challenges in learning history. The survey sample consisted of 10 participants, with 67% of respondents from Form 5 and 33% from Form 4. Regarding gender, 55.7% were male, and 44.3% were female.

The data shows that **visual learning** is the most preferred style, with 60.4% of respondents favoring it. Other learning styles include **auditory learning** (45.3%), **kinesthetic learning** (17.9%), and **collaborative learning** (17%). A significant finding is that **68.9%** of respondents find traditional history lessons boring or unengaging, primarily due to the monotonous teaching style (60.4%), overemphasis on memorization (68.9%), and lack of interactivity (33%). Importantly, **77.4%** of students preferred learning history more interactively. Additionally, **53.8%** of participants strongly agreed that they enjoy playing video games, and **72.6%** had never played a history-based educational game. However, **74.5%** showed interest in playing such a game, and **84.6%** indicated they would be more likely to learn history through a video game format.

These findings highlight the potential of game-based learning to address students' dissatisfaction with traditional methods, offering a more engaging and interactive alternative that aligns with their interests and preferences.

4. Results

Description of GBL Model

The Game-Based Learning (GBL) design model forms the foundation of *MyPerjuangan*, an educational game that enhances historical knowledge through immersive gameplay. The model integrates ten core elements, although not all are fully utilized. These elements (shown in **Table 1**) include game goals, interaction, freedom, fantasy, narrative, sensation, and challenge, aligning with the game's objectives of engaging players while teaching them about historical events.

Table 1: GBL Design Model

Element	Description
Game goal	Educates players on historical events, enabling them to gain proficiency in history.
Game mechanism	The game operates as a historical adventure, involving quizzes on significant events and figures.
Interaction	Players engage with clues and quizzes, using critical thinking to progress through the game.
Freedom	Players can make mistakes without real-world consequences, fostering an environment for learning and retrying.
Game fantasy	Transports players to adventure settings, recreating key historical environments and events.
Narrative	Uses verbal storytelling and visual cues to guide players through historical topics and phases.
Sensation	Engages players with animations, sound effects, and interactive elements.
Game value	Players earn scores for completing quizzes, reinforcing the importance of mastering the content.
Challenge	Players face challenges through clues and quizzes, reflecting the experience of historical enthusiasts.

Incorporating these elements, *MyPerjuangan* creates an immersive and interactive experience where players actively engage with the content through verbal storytelling and visual elements. Figure 2 highlights the importance of narrative design, where verbal storytelling and cues guide players through different historical phases. Including interactive sound effects and animations further immerses players, making history education more engaging and enjoyable.

Figure 2: Verbal Storytelling



Figure 3: Scores for completing task



The game fosters a positive learning environment by allowing players the freedom to make mistakes and learn without penalties. The challenge and reward system, such as earning scores for correctly answering quiz questions, motivates players to deepen their historical understanding, as depicted in Figure 3.

Diagrams

The Use Case Diagram provides a simplified visual representation of how users interact with the system within the *MyPerjuangan* game. Figure 4 outlines twelve distinct use cases. Key functionalities include starting the game, selecting from five game levels (each tied to a Form 4 history topic), accessing the options menu for customization, and using game controls for smoother navigation. Players can also pause the game or return to the main menu. Adjusting sound and background music enhances the gaming experience, and players can exit the game directly from the main menu.

Figure 4: Use Case Diagram

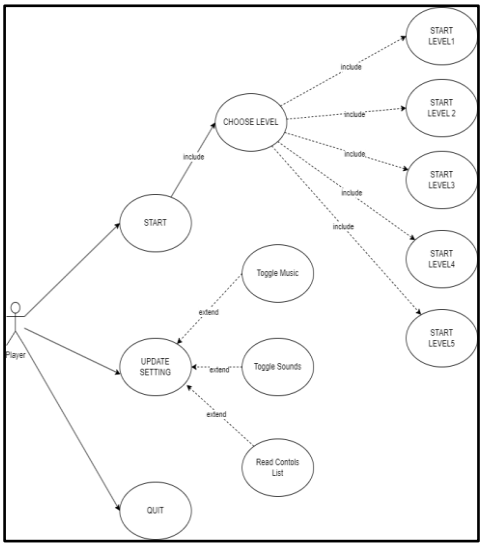
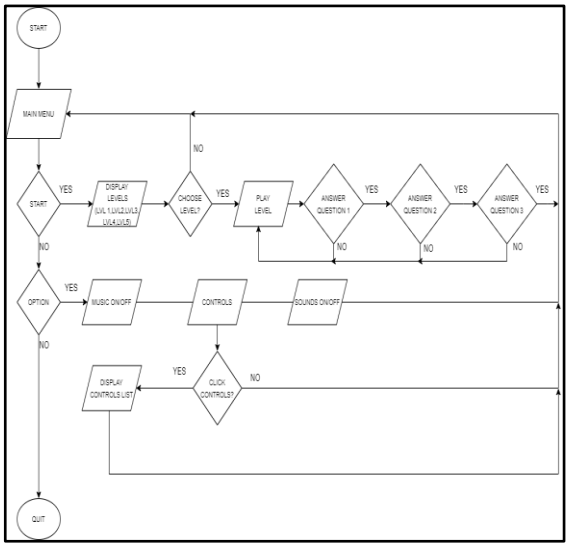


Figure 5: *MyPerjuangan GBL Flowchart*



The flowchart offers a visual roadmap of user interactions, detailing players' sequential steps while navigating the game. Figure 5 depicts the player's journey, from initiating the game at the main menu to selecting a level, customizing game options, and playing through the levels. Each interaction, such as selecting levels or modifying sound settings, is mapped out to ensure seamless flow. The flowchart also includes options to pause or quit the game, guiding users through different stages and interactions within the game.

E-Game Flow

User enjoyment testing is critical to enhancing the *MyPerjuangan* game. The **E-Game Flow questionnaire** assesses user engagement, focusing on key dimensions such as autonomy, challenge, delight, and stress. This tool serves dual purposes: gathering player feedback and ensuring compliance with the Game Development Life Cycle (GDLC) framework.

The insights from the questionnaire enable developers to understand how users interact with the game, identifying areas for improvement. By analyzing this data, iterative adjustments can be made to optimize gameplay enjoyment and educational effectiveness. Such refinements are essential in ensuring the game remains engaging while fulfilling its instructional objectives.

Figure 6 (Mohd Rozaidi et al., 2018), the **E-Game Flow Questionnaire Model**, visually represents the factors influencing user enjoyment, offering a framework for evaluating player satisfaction during gameplay.

Figure 6: E-Game Flow Questionnaire Model

Factors	Code	Content
Concentration	CO1	This game grab my attention
	CO2	This game provide content that stimulate my attention
	CO3	Generally speaking, I can remained concentrate in the game
	CO4	Most of the gaming activities are related to the learning task
	CO5	Workload in the game is adequate
Goal Clarity	GC1	Overall game goals were presented in the beginning of the game
	GC2	Overall game goals were presented clearly
	GC3	Generally speaking, I can remained concentrate in the game
	GC4	Intermediate goals were presented in the beginning of each scene
	GC5	Intermediate goals were presented clearly
Feedback	F1	I received feedback on my progress in the game
	F2	I received immediate feedback on my action
	F3	I am notified of new task immediately
	F4	I received information on my success (or failure) of immediate goals immediately
Challenge	CH1	The game provides "hints" in the text that help me overcome the challenges
	CH2	The game provides video or audio auxiliaries that help me overcome the challenges
	CH3	I enjoy the game without feeling bored or anxious
	CH4	The game provide different level of challenges that tailor to different player
	CH5	The game provides new challenges with an appropriate pacing
	CH6	The game provides "online support" that help me overcome the challenges
Autonomy	A1	I feel a sense of control and impact over the game
	A2	I know next step in the game
	A3	I feel a sense of control over the game
Immersion	I1	I forget about time passing while playing the game
	I2	I become unaware of my surrounding while playing the game
	I3	Generally speaking, I can remained concentrate in the game
	I4	I temporarily forget worries everyday life while playing the game
	I5	I experienced an altered sense of time
	I6	I can be involved in the game
	I7	I feel emotionally involved in the game
	I8	I feel viscerally involved in the game
Knowledge Improvement	KI1	The game increase my knowledge
	KI2	I catch the basic ideas of the knowledge taught
	KI3	I try to apply the knowledge in the game
	KI4	The game motivate the player to integrate the knowledge taught
	KI5	I want to know more about the knowledge taught

The E-Game Flow questionnaire is instrumental in guiding the development process, enabling informed improvements that enhance the user experience. This structured feedback loop ensures that the game continues to align with its educational goals while providing players with an engaging and enjoyable experience.

Overall Findings

The overall findings from the E-Game Flow questionnaire offer key insights into user engagement with the *MyPerjuangan* game. The evaluation covered concentration, goal clarity, feedback, challenge, autonomy, immersion, and knowledge improvement, providing a comprehensive view of the user experience.

High **mean values,** as referred to in Table 2 for concentration (4.8, 4.6) and goal clarity (4.7), suggest that players remained focused and found the game's objectives clear. Similarly, **feedback** (4.8) was positively rated, indicating that players received adequate guidance during gameplay. Regarding the **challenge**, scores varied from 3.8 to 4.9, reflecting differing perceptions of difficulty. Some players found the challenges appropriately stimulating, while others experienced them as more demanding. **Autonomy** (4.8) and **immersion** (4.5 to 4.9) were highly rated, showing that players felt in control and deeply engaged. The highest scores were recorded for **knowledge improvement** (4.8 to 5.0), confirming the game's success in enhancing players' historical understanding.

Table 2: Mean Value of Questionnaire

Aspect	Code	Question	Mean	Mean Percentage (%)
Concentration	C01	This game grabs my attention.	4.80	96.0
	C02	This game provides content that stimulates my attention	4.60	92.0
	C05	The workload in the game is adequate.	4.60	92.0
Goal Clarity	GC1	Overall game goals were presented clearly.	4.70	94.0
	GC2	I can remain concentrated in the game.	4.70	94.0
Feedback	F1	I received feedback on the progress of the game.	4.80	96.0
	F5	I received feedback on my success (or failure) of immediate goals immediately.	4.80	96.0
Challenge	CH1	The game provides "hints" in the text that help me overcome the challenges.	4.90	98.0
	CH3	I enjoy the game without feeling bored or anxious.	4.10	82.0
	CH5	This game provides new challenges with appropriate pacing.	3.80	76.0
Autonomy	A1	I feel a sense of control and impact over the game.	4.80	96.0
	A2	I know the next step in the game.	4.90	98.0
	A3	I feel a sense of control over the game.	4.80	96.0
Immersion	I3	Generally speaking, I can remain concentrated in the game.	4.50	90.0
	I6	I can be involved in the game.	4.60	92.0
	I7	I feel emotionally involved in the game.	4.80	96.0
Knowledge Improvement	K1	The game increases my knowledge.	4.80	96.0
	K3	I try to apply the knowledge in the game.	4.80	96.0
	K4	The game motivates the player to integrate the knowledge taught.	5.00	100.0

In conclusion, the game performed well in maintaining user focus, providing clear objectives and feedback, and improving knowledge. However, variations in the perceived difficulty suggest that the challenge level may benefit from further refinement.

5. Conclusion and Recommendations

The *MyPerjuangan* project was developed to support history teachers in Malaysia by creating an engaging and educational tool for teaching historical content. The game leverages vibrant graphics, smooth animations, intuitive controls, and appealing sound design to create an immersive environment. By transforming textbook-based history lessons into interactive gameplay, *MyPerjuangan* makes historical events more engaging and accessible to students. Players receive immediate feedback through rewards, such as stars, and can track their

progress across multiple levels. The game aims to blend accurate historical content with entertaining gameplay to offer students a novel way to learn and enjoy history.

Despite the project's success, several limitations surfaced during development and testing. One fundamental limitation is that the game is only accessible on desktop devices, excluding users who rely on mobile or tablet platforms. This restriction potentially limits the game's reach and impact. The game's content is also focused solely on Chapter 3 ("Pendudukan Jepun Di Negara Kita") from the Form 4 history syllabus. Although this chapter is valuable, the narrow focus reduces the game's broader appeal for students seeking a comprehensive history learning experience. Another limitation involves the game's immersion. While the game offers engaging content, it lacks advanced immersive technology such as virtual reality (VR), which could significantly enhance the learning experience. Incorporating VR could provide users with a more engaging, interactive environment and align the game with contemporary educational trends that leverage immersive technology to boost engagement and knowledge retention.

To address these limitations, several recommendations have been proposed to improve the game's accessibility and educational value. First, the game should be expanded beyond desktop accessibility to compatibility with mobile and tablet platforms. This expansion would cater to a broader audience and ensure the game is accessible to users with different device preferences, making it a more inclusive educational tool. Second, the scope of the historical content covered in the game should be broadened. By introducing additional topics from the Malaysian history curriculum, *MyPerjuangan* can offer a more comprehensive learning experience that appeals to a broader range of students. This would make the game more versatile as a learning tool and enhance its educational effectiveness. Finally, incorporating immersive technologies such as virtual reality (VR) would significantly enhance the interactivity and engagement levels of the game. By providing a more immersive experience, *MyPerjuangan* could offer a more prosperous, dynamic learning environment that aligns with cutting-edge educational technologies. This integration would significantly elevate the game's potential to engage users and improve knowledge retention.

Overall, *MyPerjuangan* successfully achieves its primary objective of creating an educational game aligned with the Malaysian history curriculum for Form 4 and Form 5 students. It addresses the challenge of making history more enjoyable using interactive game elements, resulting in a high user satisfaction rating of 94.3%. While limitations such as platform exclusivity and a narrow content scope exist, the proposed recommendations for diversifying platform accessibility, expanding historical content, and integrating VR provide a clear pathway for the game's future development. As an educational tool, *MyPerjuangan* represents a promising, innovative approach to making history learning more engaging for students and teachers.

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