



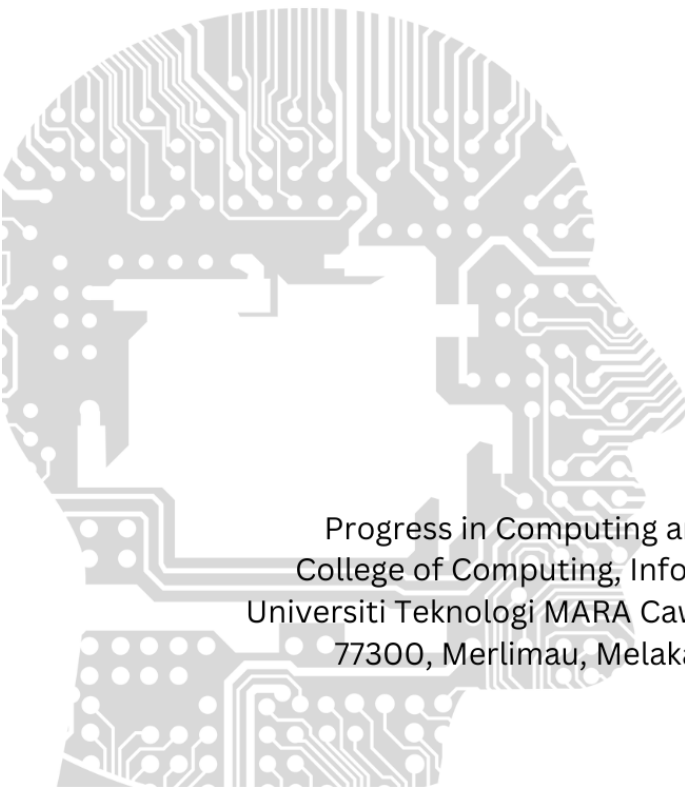
Cawangan Melaka

PCMJ

Progress in Computing and Mathematics Journal

volume 1

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Progress in Computing and Mathematics Journal
College of Computing, Informatics, and Mathematics
Universiti Teknologi MARA Cawangan Melaka, Kampus Jasin
77300, Merlimau, Melaka Bandaraya Bersejarah

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PREFACE

Welcome to the inaugural volume of the **Progress in Computing and Mathematics Journal (PCMJ)**, a publication proudly presented by the College of Computing, Informatics, and Mathematics at UiTM Cawangan Melaka.

This journal represents a significant step in our commitment to fostering a vibrant research culture, initially providing a crucial platform for our undergraduate students to showcase their intellectual curiosity, dedication to scholarly pursuit, and potential to contribute to the broader academic discourse in the fields of computing and mathematics. However, we envision PCMJ evolving into a beacon for researchers both nationally and internationally. We aspire to cultivate a space where groundbreaking research and innovative ideas converge, fostering collaboration and intellectual exchange among established scholars and emerging talents alike.

The manuscripts featured in this first volume, predominantly authored by our undergraduate students, are a testament to the hard work and dedication of these budding researchers, as well as the guidance and support provided by their faculty mentors. They cover a diverse range of topics, reflecting the breadth and depth of research interests within our college, and set the stage for the high-quality scholarship we aim to attract in future volumes.

As editors, we are honored to have played a role in bringing this journal to fruition. We extend our sincere gratitude to all the authors, reviewers, and members of the editorial board for their invaluable contributions. We also acknowledge the unwavering support of the college administration in making this initiative possible.

We hope that PCMJ will inspire future generations of students and researchers to embrace research and innovation, to push the boundaries of knowledge, and to make their mark on the world of computing and mathematics.

Editors

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CIVIC HEROES; ENHANCING CIVIC AWARENESS THROUGH GAME-BASED LEARNING

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Article Info

Abstract

This project seeks to address a critical societal need by focusing on the enhancement of civic awareness among young adults in Malaysia through an innovative approach— game-based learning. Recognizing the pivotal role of civic engagement in shaping the future of communities, the motivation stems from a desire to empower the younger generation with a profound understanding of their civic responsibilities and rights. The methodology employed involves harnessing the inherent appeal of video games to captivate and educate. By integrating a game enjoyment scale, the project aims to measure the level of engagement and satisfaction experienced by users throughout the gameplay. This not only ensures an enjoyable experience but also provides valuable insights into the effectiveness of the game as an educational tool. The game's design prioritizes interactive elements that encourage active participation, critical thinking, and decision-making, mirroring real-world civic scenarios. Through this immersive experience, players are expected to develop a nuanced understanding of civic issues, democratic processes, and the importance of their role in societal progress. This research contributes to the growing field of serious games for education, demonstrating the potential of game-based learning in cultivating informed and engaged citizens. The findings are expected to provide practical insights into the intersection of game enjoyment and civic education, offering a novel and effective strategy for promoting civic awareness among the youth in Malaysia. As the project unfolds, it aspires to not only measure the success of its approach through the game enjoyment scale but also to inspire a new wave of civic-minded individuals who are equipped with the knowledge and motivation to actively contribute to the betterment of their communities and society at large.

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Keywords: Game-based learning; Civic awareness.

INTRODUCTION

The level of civic consciousness among Malaysians has significantly decreased in recent years. According to Tan Sri Lee Lam Thye (2016), society is still lacking in civic mindedness. This may be the outcome of young people in our nation having little exposure to civic mindedness and therefore lacking knowledge about civic awareness.

“Games have the power to teach, train and educate” and are effective means for learning skills and attitudes that are not so easy to learn by rote memorization (Michael & Chen, 2006, p. 1). Game-based learning has the potential to be more motivating and engaging than standard classroom recheck formatting: starting 2nd should indent for 1st sentence 16 instruction. Games are made to be interactive and immersive, which can help kids learn in a more fun and lasting way. Users can learn about civic awareness while playing the game.

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 (Su, Shen, Esposito, Hopfinger, & Tseng, 2019).

The latest research in 2019 shows that young Malaysians are less likely to be involved in conventional politics, particularly voting, and becoming members of political parties (Hed et al., 2020). The need for civic awareness among Malaysians is a growing concern, and there is a need for innovative approaches to address this issue.

This project aims to design a 3D game-based learning storyboard, develop a corresponding application, and assess the enjoyment of learning civic awareness through gaming.

This project targets young adults aged 18 to 25 seeking to enhance their civic education. It involves a 3D desktop game with multimedia components focusing on civic engagement topics like voting rights and political involvement. Players navigate through scenarios, solving puzzles and answering questions to escape from a maze while learning about civic responsibilities. The goal is to provide an engaging platform for users to develop their civic consciousness.

LITERATURE REVIEW

Civic education encompasses several important elements, such as learning or gaining knowledge of government, its functions, and the morally acceptable duties and responsibilities of citizenship (Collins English Dictionary, 2012).

There are five topics that will be covered and implemented into this project which are Voting in Elections, Community Volunteering, Environmental Stewardship, Political Advocacy and Participation in Public Discussions.

Civic education is important in schools because it gives students the knowledge, abilities, and attitudes they need to be educated, active citizens. According to Kahne and Westheimer (2006), civic education in schools helps develop a sense of personal and social responsibility, as well as a commitment to the values and principles of democracy.

According to Kiili, K. (2014), students can practise various civic roles, circumstances, and decision-making processes through games. Through simulated events, students can investigate the effects of their choices, act, and see how their choices affect society. This experiential learning strategy aids students in understanding civic ideas and how they apply in the actual world.

Game-based learning refers to the integration of games or gaming elements into the educational process to support teaching and learning (de Freitas & Oliver, 2006). Game-based learning refers to an educational approach that incorporates the use of games as a central component in the learning process. In order to enhance the acquisition of knowledge, skills, and competences, it makes use of games' engaging and interactive features. By placing students in an environment that is dynamic and interactive and allows for active participation, decision making, and problem-solving, game-based learning goes beyond conventional teaching techniques.

METHODOLOGY

Agile Methodology was selected for this project due to its ease of use and ability to satisfy the project's requirements. It's common for game developers to have to adjust to fresh ideas, customer preferences, and industry trends. Because of its flexibility to changing requirements, it will enable me to swiftly update the game's features and design in response to feedback and insights. The development process will be divided into smaller iterations. Moreover, agile reduces the likelihood of major setbacks by facilitating early risk identification and mitigation through iterative development and routine inspections.



Figure 1: Agile Methodology

The project adopts an Agile methodology, commencing with the crucial requirement phase where gathering, organizing, and prioritizing project requirements set the groundwork. Subsequently, the design phase focuses on crafting a comprehensive software flow, starting with flowcharts and storyboards to map out the project's trajectory. Transitioning into the development phase, which constitutes the bulk of the work, entails scripting the game and implementing essential game mechanisms. Utilizing Unreal Engine for game development, Blender 3D for character design, and Adobe Photoshop for 2D elements and backgrounds, this phase is meticulously executed to ensure the project's technical integrity. Following development, the testing phase becomes paramount, as it verifies the functionality and quality of the software, minimizing errors and enhancing product reliability. Once the project passes rigorous testing, it enters the deployment phase, marking its transition to practical use and accessibility to end-users. Leveraging cloud service platforms like Amazon Web Service (AWS) or Oracle Cloud, the game, named Civic Heroes, becomes available for download,

catering to a broad audience. Finally, the review phase concludes the Agile cycle, encompassing an assessment of completed work, client feedback gathering, and evaluating project success against predefined objectives, facilitating continuous improvement and client satisfaction.

RESULT AND DISCUSSION

The evaluation process for enjoyment within the game is comprehensive, employing the Egame Flow Model to gauge various aspects including concentration, goal clarity, challenge, knowledge progression, and immersion. This assessment is pivotal in determining the extent to which the project's third goal of ensuring user enjoyment during gameplay has been achieved. The evaluation procedures entail face-to-face sessions where participants engage with the game on the same laptop where it was developed. Prior to assessment, participants undergo gameplay to familiarize themselves with the mechanics and dynamics of the game. Subsequently, upon completion, participants are provided with a questionnaire via Google Form, meticulously designed to solicit feedback on their experience. To ensure precision in data collection, the target participants for this evaluation are young adults aged 18 and above who are regular computer game players, reflecting the intended user demographic accurately. The questionnaire, administered in English, utilizes a Likert scale to capture participant responses, with options ranging from strongly disagree to strongly agree, facilitating nuanced feedback interpretation. The evaluation pool comprises 30 individuals, chosen to provide a diverse yet representative sample size for robust analysis. In terms of instruments, the evaluation leverages a survey format, considered cost-effective and efficient in gathering valuable insights. While the original Egame Flow Model encompasses eight criteria, this evaluation focuses on five, omitting feedback, control, and social interaction aspects for reasons unrelated to the game's instructional goal. Each section of the questionnaire is meticulously structured to cover various facets of the gaming experience, ensuring comprehensive feedback collection for informed analysis and future improvements.

Table 1: Total average for each dimension and overall average value

Dimension	Total Mean
Concentration	4.36
Goal Clarity	4.35
Challenge	4.18
Immersion	4.18
Knowledge Improvement	4.1
Overall Percentage	85%

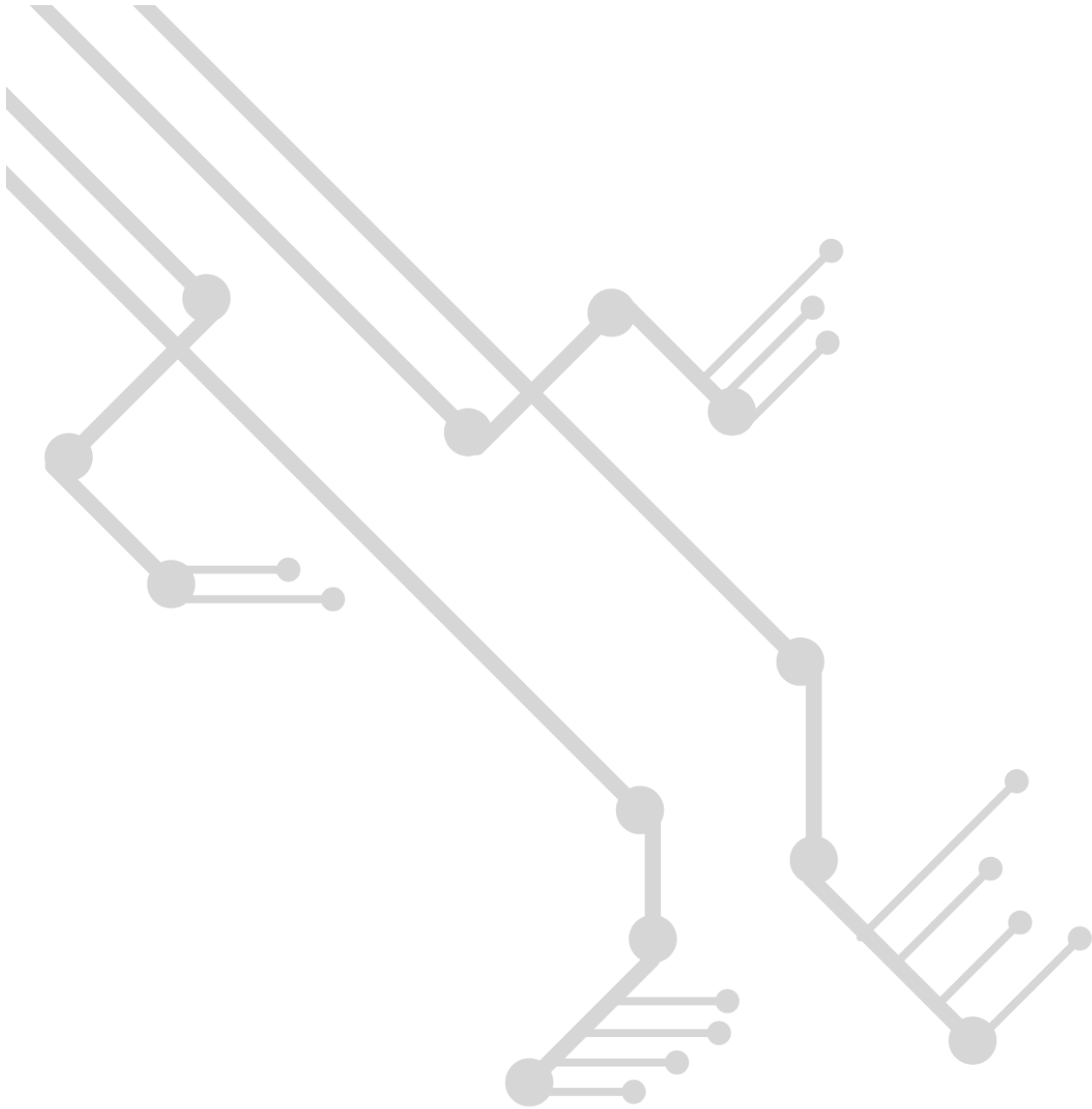
The overall average for each dimension, which is derived from the average of every item inside that dimension, is shown in Table 5.1. After combining these dimension-wise averages, an overall average value was obtained, and this value was crucial in determining how Civic Heroes was assessed using the Egame Flow model. Next, by calculating the percentage of the overall average, the agreeability of the enjoyment of Civic Heroes is ascertained. The computed overall average of 4.23 indicates a degree of agreeableness. This suggests that 85% of respondents agree that playing this game is enjoyable in terms of game-based learning.

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