

APPLICATION OF DIGITAL ENCYCLOPEDIA IN CIVICS EDUCATION: BALI NATIONAL MUSEUM PEDIA

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Abstract

This study aims to develop an advanced, technology-based learning medium through Bali National Museum Pedia, an interactive digital encyclopedia presented in the form of a flipbook. The flipbook integrates historical and national values from various museums in Bali into an engaging and accessible format. Adopting the 4D development model (Define, Design, Develop, Disseminate), the research identifies students' needs for learning media that are more visual, contextual, and easy to access. Initial findings show that 90% of students enjoy using digital media and 98% express interest in visiting museums; however, few have done so due to physical and geographical constraints. These findings emphasize the urgency of digitizing culturally rich educational content to enhance character and citizenship education. The Museum Pedia flipbook offers a concrete solution by combining multimedia elements, interactive quizzes, and mobile-friendly access, making learning more adaptive and enjoyable in 21st-century classrooms.

Keywords: Civics education, digital encyclopedia, educational technology, flipbook, interactive learning, museum.

1 INTRODUCTION

Indonesia, as a nation rich in cultural and historical diversity, bears a noble responsibility to preserve, understand, and transmit its heritage to future generations. Bali, one of Indonesia's cultural gems, has long attracted attention due to its remarkable artistic, musical, and traditional wealth, including deeply rooted history. More than 30 museums across the island serve as guardians of this heritage, housing and exhibiting various artifacts, fine arts, and historical knowledge. Museums play a crucial role in preserving and promoting a nation's culture, history, and legacy (Edson and Dean 1994; Lu 2013; Popescu and Albă 2022; Talboys 2005). However, in today's increasingly modern era, significant challenges persist in terms of public interest and actual museum visitation (Kadoyama 2018; Talboys 2011). While museums are vital sources for understanding history, culture, and civic identity, they are often perceived by students as unappealing or irrelevant. This issue is further exacerbated during

school trips to Bali, where students' attention tends to be drawn toward beaches and entertainment, often sidelining civic education.

Civic education serves as a foundational pillar in shaping citizens who are aware of their rights, responsibilities, and roles within society and the state. To achieve this goal, it is essential to provide students with learning experiences that are both engaging and relevant. Currently, the civic education curriculum is often perceived as static, with limited opportunities to integrate local cultural heritage (Ocampo and Delgado 2014). Recent studies highlight the importance of integrating local cultural heritage into civic education curricula to enhance student engagement and foster multicultural awareness. Researchers propose incorporating local wisdom and cultural values into civics lessons, making the content more relevant and meaningful for students (Ardiansyah, Yorman, and Felia Siska 2025; Sakman et al. 2024).

Amid the growing landscape of digital innovation, we see a significant opportunity to address these challenges through the development of “Bali National Museumpedia”—a digital encyclopedia that brings Bali’s museums directly to students, embedding rich lessons in civics within a dynamic and interactive medium. This digital platform aims to deliver accessible and engaging content that fuses cultural richness with civic values.

Among the museums most relevant to civic education in Bali are the Margarana National Monument (Taman Pujaa Bangsa) and the Bajra Sandhi Monument. This study will focus specifically on these two institutions. Scholarly investigations on the role of museums in education have been extensive. For instance, Randa, Sapto, & Suprpta, (2020) utilized museums as learning resources to enhance students’ understanding of history. Meanwhile, studies on the use of museums as educational media integrated with technological advancements have also grown rapidly. Putera et al., (2020), dan Raditya, Ardyanti, & Eka Putra, (2020) demonstrated how museums can become more accessible through the development of mobile-based interactive media applications. Another study by Sidiyawati, Sudarmanto, Prasetyo, & Hawari Bin Berahim, (2019) explored the Asian Art Museum using augmented reality technology. The introduction of Bali to tourists was specifically addressed by Raditya et al., (2020), focusing on game-based media featuring collections from the Panca Yadnya Museum in the Bali Botanical Garden. Beyond technological applications, studies on museums have also incorporated other disciplines, resulting in compelling academic works. For example, the study by Lisnani, Zulkardi, Putri, & Somakim, (2020) combined

mathematics with cultural studies to deepen understanding of the Balaputra Dewa South Sumatra State Museum.

Based on these considerations, this study aims to present an innovative solution in the form of a digital encyclopedia entitled Bali National Museumpedia. This encyclopedia is designed to serve as an engaging learning tool that provides comprehensive and informative content on Balinese culture, history, and civic identity. Utilizing the 4D development model (Define, Design, Develop, Disseminate), the project seeks to integrate museum experiences with civic education through a structured and engaging digital platform. Thus, this initiative not only addresses the issue of students' low interest in museum visits but also offers a broader solution. Bali National Museumpedia is expected to not only enhance students' understanding of civics but also shift their perception of museums from being outdated and uninteresting to becoming dynamic sources of knowledge. Instead, we aim to create an enjoyable learning experience that motivates students to explore essential aspects of civic life more deeply. Through the use of digital technology, the platform will also facilitate access to civic education content for students even when they are not physically in Bali. All of these efforts are part of our broader mission to improve civic understanding and cultural awareness among the younger generation, transforming them into more informed and engaged citizens.

2 METHODOLOGY

This study will be conducted in the Province of Bali, focusing on two museums that hold significant historical value and strong relevance to civic education: the Monumen Nasional Taman Pujaan Bangsa Margarana and the Monumen Perjuangan Rakyat Bali (Bajra Sandhi). These two museums were selected because they present narratives of national struggle and values that are essential to be instilled in students through interactive and contextual digital learning media.

The Monumen Nasional Taman Pujaan Bangsa Margarana, located in Tabanan Regency, Bali, was established to commemorate the heroic efforts of Indonesian freedom fighters during the Puputan Margarana battle in 1946 against Dutch forces. This museum symbolizes the spirit of nationalism and the sacrifices made by the Balinese people in defending Indonesia's independence. It houses a collection of historical documents, weaponry, and reliefs that portray the heroic story of I Gusti Ngurah Rai and his troops.

The Monumen Perjuangan Rakyat Bali (Bajra Sandhi), located in Denpasar, serves as a symbol of the Balinese people's resistance from colonial times to the post-independence era.

Its architecture resembles a bell-shaped *bajra*, representing spiritual vigor and collective strength. The museum inside this monument features dioramas that depict the history of Bali, the people's struggle, traditional values, and the evolution of social and cultural life all of which are highly relevant to civic education.

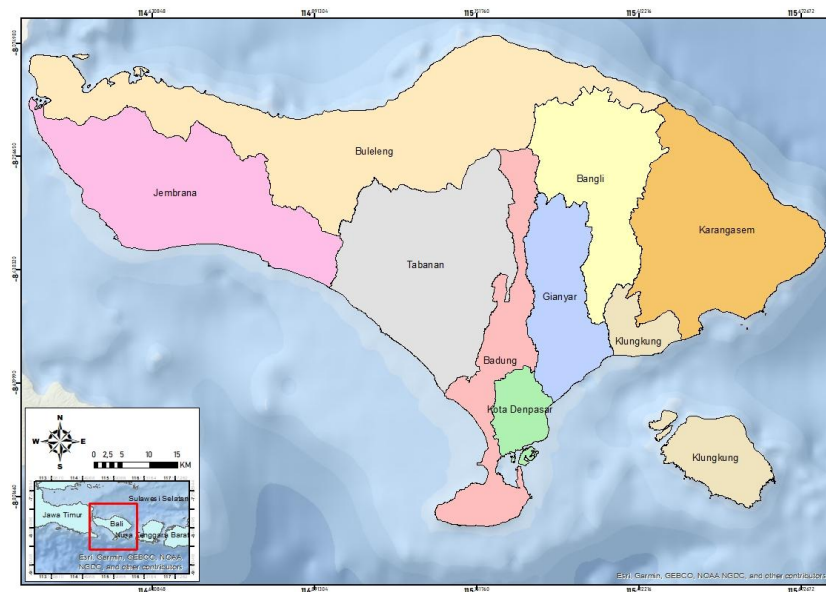


Figure 1. Location of study

The 4D model (Define, Design, Develop, and Disseminate) is a widely recognized framework for research and development, particularly in educational innovation (Indaryanti et al. 2025). It has been applied in various educational contexts, including curriculum design, instructional material development, and assessment creation (Indaryanti et al. 2025; Utaminingsih et al. 2024). This model was employed for the development of this technology-based project, including the creation of the digital book Bali National Museumpedia. The first phase, Define, serves as a critical foundation for formulating the direction and objectives of the project. In this phase, the development team conducts an in-depth identification of user needs, particularly those of students and teachers in schools across Bali. This process involves analyzing the existing curriculum, mapping out the competencies to be achieved using the digital book, and understanding the cultural and local context of Bali to be incorporated into the content. The primary goal of this phase is to establish a strong foundation to ensure that the development aligns with actual needs in the field.

Once user needs have been clearly defined, the process advances to the Design phase. In this stage, the team develops both the conceptual and technical design of the digital book. The design includes the content structure, navigation flow, and visual layout to ensure the book is

user-friendly and aesthetically appealing. Special attention is given to the design of interactive multimedia content, including image selection and interactive elements that support comprehension. All components are tailored to the characteristics of the students and are designed to be seamlessly integrated into classroom learning activities.

The next phase, Develop, involves translating the concepts and designs into a tangible product. During this phase, the team begins building the digital book platform using applications such as Canva and Heyzine. The platform is developed to support all planned interactive features. Multimedia content is then produced based on the approved design, including scriptwriting, image production, and development of other interactive features. Each element is created collaboratively to ensure coherence between the content and its presentation.

The final stage is Disseminate, which involves the distribution and implementation of the digital book. Bali National Museumpedia will be officially introduced to end users—students and teachers—through launch events in schools participating in the study. To ensure optimal use, the team will also organize dedicated training sessions for teachers. These trainings will focus on strategies for integrating the book into the curriculum and maximizing the use of its interactive features to enhance student engagement. This phase not only represents the downstreaming of the research output but also serves as a concrete form of community engagement by the Civic and Citizenship Education Program.

Through the comprehensive application of the 4D methodology, the development of the Bali National Museumpedia digital book is expected to become an innovative learning tool that is not only informative but also inspirational, with a strong emphasis on local context and the use of interactive technology to foster students' understanding of civics and national identity.

3 FINDINGS AND DISCUSSION

This study adopts the 4D development model (Define, Design, Develop, Disseminate) introduced by Thiagarajan (Thiagarajan, Semmel, and Semmel 1974). The model was selected to ensure that the development process of the Bali National Museumpedia application proceeds in a systematic and structured manner. However, this article focuses on define, design, and develop stage.

In the Define stage, the primary objective is to identify students' learning needs and understand their profiles within the context of Civic Education. To achieve this, a needs analysis was conducted through a questionnaire randomly distributed to 104 students from

several cities, including Malang, Agam, Cirebon, and Karawang. The questionnaire was designed to gather information regarding students' learning experiences, their interest in museums, and their needs for digital learning resources. In addition to the questionnaire, a literature review was carried out to identify gaps between existing learning resources and those required by students. The results revealed that although many students expressed interest in museums, they faced challenges in accessing historical and cultural artifacts.

The questionnaire data were analyzed using quantitative descriptive analysis techniques. This approach enabled researchers to identify patterns in students' responses regarding their learning needs, as well as the obstacles they faced in accessing traditional learning resources such as museums. The analysis revealed that 90% of students showed strong enthusiasm for using mobile applications as a learning medium. This finding indicates that the integration of technology in education particularly through Android-based applications can be an effective solution for improving student access to Civic Education materials.

One of the major challenges faced by students is limited access to historical and cultural resources, such as museums. Previous research findings indicated that although 98% of students expressed interest in visiting museums, only a small number had done so. The primary barriers were financial limitations, time constraints, and geographic distance. Therefore, Android-based applications such as Bali National Museumpedia are expected to provide practical solutions to address these accessibility challenges.

In the development of Bali National Museumpedia, the content was carefully curated and designed with a vibrant and visually engaging art style. Attention was given to the layout of photographs and their accompanying descriptions to captivate readers' interest. Once the final design and layout were completed, the content was transformed into an interactive flipbook accessible online at www.sl.ut.ac.id/BaliNationalMuseumpedia using the password: ppknut.

This flipbook curates information from two major museums in Bali: The Monumen Nasional Taman Pujaan Bangsa Margarana and the Monumen Perjuangan Rakyat Bali. Through this approach, students can explore national values via visual storytelling, interactive maps, and digital documentation of artifacts in an enjoyable and immersive manner.



Figure 1. Opening interface of Bali National MuseumPedia

The first section of the flipbook focuses on the Monumen Perjuangan Rakyat Bali, located in Denpasar. This section illustrates the history of the Balinese people's struggle from the colonial period to the post-independence era, depicted through the monument's majestic reliefs and architectural design. The pages, enriched with vivid illustrations and informative descriptions, convey the values of patriotism, perseverance, and national unity embodied in the Balinese struggle. Moreover, students are guided to understand the historical context of the artifacts through narrative explanations, quotations, and educational trivia. Interactive features such as quizzes and audiovisual commentary further enhance the learning experience, allowing students to feel as if they are physically present at the site.

The flipbook then introduces the Monumen Nasional Taman Pujaan Bangsa Margarana, a significant historical site that commemorates the struggle of I Gusti Ngurah Rai and the Balinese fighters during the Puputan Margarana battle. The content in this section is presented through visual storytelling, showcasing emotionally evocative documents and photographs of the struggle. Each page highlights strong values of bravery, sacrifice, and patriotism, leaving a lasting impression—especially for students who have never visited the museum in person. This approach makes civic education more contextual, as students are able to directly observe visual representations of the values taught through local historical narratives.



Figure 2. Content of Bali National Museumpedia

This flipbook is designed to meet the needs of 21st-century students who increasingly rely on technology in their daily lives. *Bali National Museumpedia* not only provides information but also fosters interaction through features such as interactive quizzes. The high-quality visuals used in this application aim to introduce museum collections in an engaging and educational manner, offering students the opportunity to learn flexibly according to their individual learning styles.

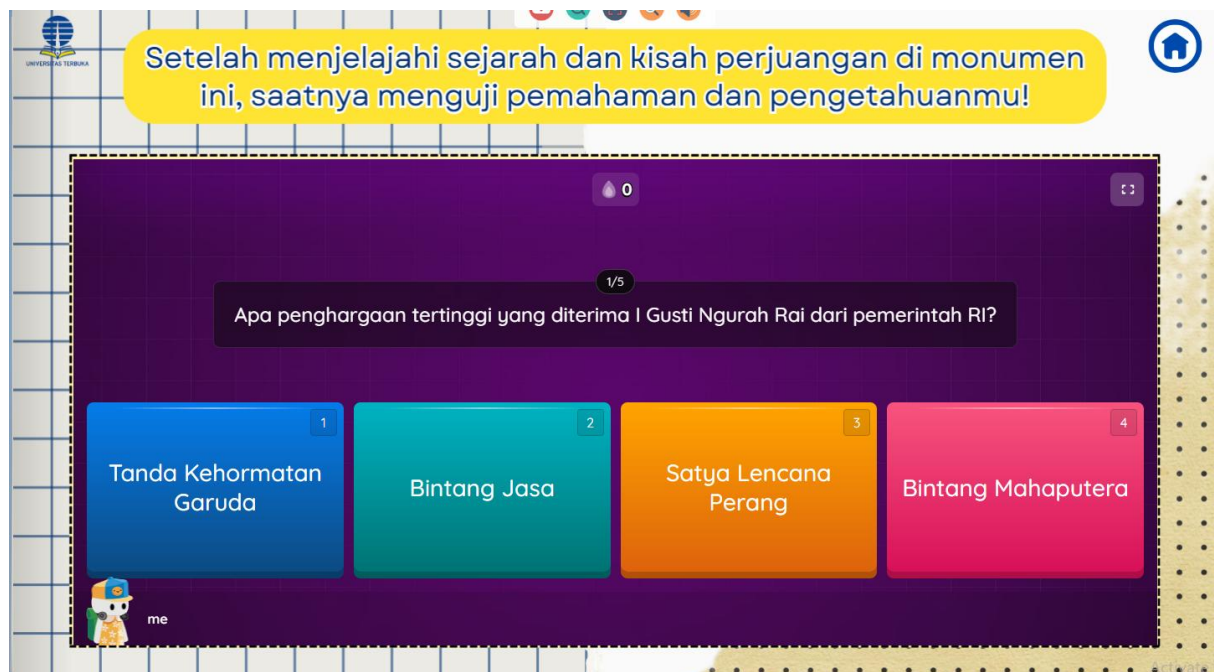


Figure 3. Quiz in Bali National Museum

This application enables students to access historical and cultural information about Bali virtually, through museum tours, high-quality images of artifacts, and interactive explanations of historical heritage. As a result, students are no longer limited to physical visits and can access learning materials anytime and anywhere via their mobile devices. Interactive features such as quizzes and educational games encourage students to learn more actively, enhance their engagement, and deepen their understanding of the material. This approach provides an enjoyable learning experience, which in turn can increase students' interest in the subject matter.

Through this application, students gain a more contextual and visual understanding of civic education, particularly concerning national identity and cultural values. The visualization of artifacts and virtual museum tours help students connect historical concepts with real objects, thereby strengthening their comprehension. The use of technology also supports multimedia-based learning, demonstrating that a combination of text and visuals is more effective for students. Technology empowers learners to study at their own pace and style, allowing for independent exploration and repetition when needed, and ultimately promoting more personalized and responsible learning.

4 CONCLUSION

This study demonstrates that the use of technology-based applications, such as Bali National Museumpedia, can enhance students' access to historical and cultural learning resources, particularly for those who face difficulties in physically visiting museums. By utilizing an interactive flipbook, the application introduces national values in a contextual and engaging manner, enabling students to learn independently and flexibly. For future development, the application should be expanded by incorporating additional interactive features such as videos and educational games, as well as extending its reach to underserved areas. Collaborations with more museums are also recommended to enrich the application's content. Moreover, providing training for teachers is essential to ensure they can effectively integrate the application into their teaching practices. These efforts will help ensure that Bali National Museumpedia contributes to improving the overall quality of civic education in a broader and more impactful way.

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