ENHANCING ENGAGEMENT AND UNDERSTANDING: PROJECT-BASED LEARNING AND INTERACTIVE E-MODULES IN TEACHING ARCHIPELAGIC CULTURAL DIVERSITY TO ELEMENTARY SCHOOL STUDENTS

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Abstract: This research delves into the integration of interactive e-modules within a Project-Based Learning (PBL) framework to teach the theme of Indonesia's archipelagic cultural diversity in Grade VI elementary school. Situated within the context of rapid digitalization and the need for educational innovation, this study addresses the potential of technology to foster deeper engagement and conceptual understanding. Employing a qualitative case study methodology, data were gathered through classroom observations, in-depth interviews with students and a teacher, and analysis of learning documents. The findings reveal that the synergistic application of PBL and interactive e-modules significantly enhances student active participation, enriches their learning experiences, and facilitates a more profound and contextual understanding of cultural diversity. Furthermore, the approach effectively cultivates essential collaborative and social skills. However, challenges such as disparities in technological access and time management for students were identified. This study contributes to the existing literature by providing an empirical model for integrating digital tools with constructivist pedagogy in primary education, specifically within the domain of social and cultural literacy. It concludes that, with adequate institutional support and strategic planning, this combined approach can substantially improve the quality and effectiveness of learning in elementary schools.

Keywords: Basic Education, Cultural Diversity, Interactive E-Modules, Project-Based Learning, Qualitative Study

INTRODUCTION

The contemporary educational landscape is undergoing a profound transformation, largely propelled by the relentless advancement of digital technology. This shift necessitates a move away from traditional, transmissive pedagogies towards more dynamic, interactive, and student-centered learning environments (Adha, 2020). Technology no longer serves merely as a supplementary tool but has become an integral component of the learning ecosystem, enabling unprecedented access to information and fostering innovative digital learning solutions. Among these innovations, interactive e-modules have emerged as a powerful medium to increase learner engagement and autonomy (Ramadhan et al., 2023). These e-modules transcend the static nature of traditional textbooks, offering a platform for dynamic interaction, multimedia integration, and self-paced learning, thereby providing a richer and more immersive educational experience (Hidayat et al., 2023).

The pedagogical value of interactive e-modules lies in their alignment with constructivist learning theories. They facilitate a more meaningful learning process where students actively construct knowledge through direct interaction with the content and their learning environment (Winantha, 2018). Students' positive attitudes are gradually formed through controlled interactions between them and their surroundings (Zulkhairi &

Hajar, 2023). This is particularly relevant at the elementary school level, where concrete and engaging experiences are crucial for knowledge acquisition.

In the context of learning about the cultural diversity of the Indonesian archipelago within the Indonesian language curriculum, the application of interactive e-modules is especially pertinent. The vast and varied nature of Indonesian culture can be challenging to convey through text alone. Interactive e-modules can bridge this gap by using multimedia elements—such as videos of traditional ceremonies, audio of regional languages and music, and high-quality images of artifacts and traditional houses—to make abstract cultural concepts tangible and relatable. Using video and audio enhances students' motivation to learn English speaking (Hajar et al., 2024a). Video and audio media not only boost students' interest but also aid in developing a deeper, more empathetic understanding of the nation's cultural wealth (Windi & Widodo, 2022).

Concurrently, the Project-Based Learning (PBL) approach has gained significant traction in modern education for its efficacy in nurturing the critical 21st-century skills demanded in today's world. PBL is an instructional methodology that engages students in complex, real-world problems and challenges, requiring them to investigate and respond to an authentic, engaging, and complex question, problem, or challenge over an extended period (Habibah, 2024). This approach moves learning beyond the confines of the classroom, allowing students to explore topics in a contextual and meaningful manner (Faslia et al., 2023). By placing students at the center of the learning process, PBL fosters greater agency, independence, and ownership of learning (Sri, 2023). Students are not passive recipients of information but active designers, collaborators, and constructors of their understanding.

Existing research suggests a powerful synergy when technology like interactive e-modules is combined with pedagogical approaches like PBL. This combination has been shown to heighten student motivation and active participation in the learning process (Maharani, 2024). The e-module can serve as a digital "project guide" and "resource hub," providing the scaffolding, information, and multimedia assets students need to conduct their inquiries and create their project outputs. However, a review of the literature indicates that the majority of studies exploring the integration of PBL and interactive e-modules have concentrated on science, technology, engineering, and mathematics (STEM) subjects (Bantani et al., 2024). Research focusing on the integration of these two elements in the humanities, particularly in cultural education and literacy at the primary school level, remains relatively scarce. This gap presents a significant opportunity for scientific contribution.

The development of e-modules as a form of digital learning media has been extensively discussed by Indonesian experts. Istiqoma (2023) defines e-modules as electronic modules presented interactively, enabling students to learn independently with the support of multimedia that facilitates comprehension of the material. A well-designed e-module, according to Istiqoma, must adhere to the principles of interactivity, learner autonomy, and accessibility, allowing students to access learning materials anytime and anywhere. This perspective is echoed by Saputri (2024), who asserts that e-modules can enhance learning effectiveness, particularly in accommodating diverse learning styles in the digital era. Therefore, the development of e-modules must focus not only on content quality but also on user-friendly and interactive design to

provide a meaningful learning experience.

Based on this comprehensive background, this research aims to conduct a detailed analysis of how the use of PBL-based interactive e-modules contributes to increasing learner engagement and understanding in the specific context of learning about the cultural diversity of the archipelago in Grade VI elementary school. This study will also explore the broader impact of this integrated approach on the learning process and outcomes, with a specific focus on how it supports more contextual, relevant, and engaging learning for young students. The findings are expected to offer valuable insights and a practical model for educators and curriculum developers seeking to create more effective, adaptive, and technology-enhanced learning experiences that foster a deep understanding of complex socio-cultural topics.

METHOD

This research employed a qualitative approach with a single-case study design. The qualitative methodology was deemed most appropriate as it allows for an in-depth, nuanced exploration of a phenomenon within its real-life context, focusing on the "how" and "why" questions. The case in this study was the implementation of a PBL-based interactive e-module on the topic of archipelagic cultural diversity in a single Grade VI classroom at an elementary school in Malang, Indonesia.

The research subjects were purposively selected and comprised 30 students who participated in the learning program and their Indonesian language teacher. The teacher was selected for her experience in implementing technology and student-centered approaches. The students represented a range of academic abilities and levels of familiarity with digital tools.

A multi-method approach to data collection was adopted for this study to ensure both triangulation and the comprehensiveness of the gathered information. This strategy allowed for the phenomenon to be examined from multiple angles, thereby strengthening the validity and depth of the findings.

The primary instrument for capturing the live dynamics of the classroom was participant observation. In this capacity, the researcher assumed the role of a non-participant observer during several learning sessions where the interactive e-module was actively in use. A structured observation protocol was employed to systematically document a range of critical factors, including overt student behaviors, discernible levels of engagement, the nature of group interactions and dynamics, and the specific ways in which students interacted with the digital module and with one another during the project work.

To complement the observational data and to understand the participants' personal experiences and perceptions, in-depth, semi-structured interviews were conducted. The interviewees included the classroom teacher and a purposively selected sample of eight students. This sample was strategically chosen to represent a spectrum of engagement levels—high, medium, and low—as identified through the initial observations. The interviews with students were designed to explore their personal experiences with the new learning approach, their perceptions of the e-module's utility and appeal, the challenges they encountered throughout the project, and their self-assessed understanding of the cultural diversity material. Concurrently, the interview with the teacher focused on her professional observations regarding shifts in student engagement, her assessment of the learning outcomes compared to traditional methods, and the practical challenges she faced during implementation.

Finally, a document analysis was performed to collect supplementary and tangible evidence of the learning process and outcomes. This involved a systematic review of various artifacts produced during the study. These documents included the students' own project outputs, such as digital posters, presentation slides, and written project reports, which served as direct evidence of their learning and skill application. Additionally, the teacher's lesson plans and the interactive e-module itself were analyzed to provide further context for the learning environment and the resources available to the students.

The data collection procedure unfolded in a series of structured stages. It began with a planning phase, which involved obtaining permissions, preparing the research instruments, and conducting an initial briefing with the teacher. This was followed by the implementation phase, where the teacher facilitated the learning unit using the PBL model, with the interactive e-module serving as the core resource. Observations were conducted throughout this phase. Subsequently, after the completion of the projects, the post-implementation phase involved conducting the in-depth interviews with the selected students and the teacher, as well as collecting all relevant project documentation.

The collected data were analyzed using thematic analysis, following the iterative process outlined by Braun and Clarke (2006). This involved familiarizing oneself with the data through repeated reading and listening, generating initial codes, searching for themes based on the coded data, reviewing and refining potential themes, defining and naming the final themes, and producing the analytical report. The analysis aimed to identify recurring patterns of experience and meaning related to engagement, understanding, collaboration, and implementation challenges. This rigorous process ensured that the findings were deeply grounded in the empirical data collected from the field.

FINDINGS AND DISCUSSION

The implementation of the Project-Based Learning (PBL) unit, supported by the interactive e-module on archipelagic cultural diversity, yielded rich data that can be synthesized into several key thematic findings. These findings not only describe the outcomes but also provide a basis for a deeper discussion connecting them to established educational theory and prior research.

Elevated Student Engagement and Active Participation

The most immediately observable impact was a significant surge in student engagement. The observational data consistently indicated that students were more actively involved in all phases of the learning process compared to traditional, teacher-led lessons. The interactive e-module catalyzed this engagement. Instead of passively listening to lectures, students were observed actively navigating the e-module, clicking on embedded links to watch videos of traditional dances, listening to audio clips of regional folk songs, and exploring interactive maps showing the geographical distribution of different cultures. It happens as videos provide various advantages, notably enhancing comprehension through the integration of audio and visual elements (Muslem et al., 2019).

During project work, the classroom atmosphere was characterized by a productive hum of activity. Students were deeply engrossed in group discussions, negotiating roles, and collaboratively searching for additional information within the e-module to complete their projects. A notable observation was the transformation of students who were typically disengaged in conventional settings. These students began to contribute more confidently in their groups, especially when the project

tasks aligned with their personal interests, such as drawing, digital design, or storytelling. The teacher corroborated this in her interview, stating, "I saw students who are usually quiet become the 'experts' in their group when it came to using the technology or explaining a video they found. The e-module and the project gave them a different platform to shine."

This finding supports Hajar et al. (2024b), who found that teachers should prioritize addressing students' needs by focusing on their physical well-being, creating a sense of security, and showing genuine concern for their welfare. This finding strongly aligns with the principles of constructivism, particularly those espoused by Jean Piaget, who emphasized that learners build knowledge through active interaction with their environment (Toner et al., 2016). The PBL model, by its very nature, creates an environment ripe for such interaction. The interactive e-module enriched this environment by providing a multifaceted, digital "environment" with which students could actively engage. The increase in intrinsic motivation, as noted by Nurishlah et al. (2023), is evident here; the autonomy to explore and the authenticity of the project task fostered a sense of ownership and curiosity that drove engagement beyond the requirement of a grade.

Deepened Conceptual Understanding of Cultural Diversity

The data from interviews and the analysis of project outputs provided compelling evidence of a deepened understanding of the cultural diversity material. In their interviews, students were able to articulate their knowledge with a level of detail and contextual awareness that, according to the teacher, was uncommon after a standard textbook-based unit. They did not merely recite facts but explained the "why" behind certain traditions, drew comparisons between cultures from different islands, and expressed the importance of preserving this diversity as a national asset.

For instance, one student group created a digital poster on the "Rumah Gadang" of West Sumatra. Their presentation went beyond describing its physical appearance; they explained its matrilineal significance, the meaning behind the distinctive horn-shaped roof, and how the structure is designed for communal living. This depth of understanding was directly traced back to the resources in the e-module, which included a 3D rotational view of the house, an interview with a cultural expert, and a folktale related to its origin. This resonates with the concept of multimedia learning proposed by Mayer (2009), which suggests that people learn more deeply from words and pictures than from words alone. The work of Aghni (2018) on the functions of learning media supports this, indicating that visual and multimedia aids help in concretizing abstract concepts, making them more accessible and memorable for learners with diverse learning preferences.

The teacher confirmed this enhancement, noting, "Their retention and ability to elaborate on the material were markedly better. When asked to explain, they used examples from the videos and interactive elements they had explored, showing that they had not just memorized but had internalized the concepts." This outcome demonstrates how the combination of PBL's inquiry-based structure and the e-module's rich multimedia content facilitated a more robust cognitive processing of information, leading to a conceptual understanding rather than superficial recall.

Development of Collaborative and Social Skills

Beyond academic knowledge, the study highlighted the significant role of this integrated approach in developing students' socio-collaborative competencies. The PBL framework

necessitated teamwork, and observations revealed a clear evolution in students' abilities to collaborate effectively. Initially, some groups struggled with dividing tasks and managing disagreements. However, as the project progressed, they developed strategies for collaboration. Students were observed assigning roles based on individual strengths (e.g., "researcher," "designer," "presenter"), sharing resources they discovered within the e-module, and providing constructive feedback to one another.

The final project presentations served as a testament to the development of their communication skills. Students presented their findings to the class with greater confidence and clarity. More importantly, during the question-and-answer sessions, they demonstrated improved critical thinking and respect for differing viewpoints as they responded to peers' queries. This social dimension of learning is a cornerstone of Lev Vygotsky's sociocultural theory, which posits that social interaction is fundamental to cognitive development (Vygotsky, 1998). The collaborative nature of the projects created a "zone of proximal development," where students, with support from peers and the teacher, could achieve learning outcomes they might not have accomplished independently (Agustyaningrum et al., 2022). This finding is consistent with the research of Zubaidah (2020), which underscores the importance of collaborative learning in honing communication, cooperation, and conflict-resolution skills essential for the 21st century.

Implementation Challenges: Technology Access and Time Management

Despite the overwhelmingly positive outcomes, the study also uncovered significant practical challenges. The most prominent was the issue of equitable access to technology. While the school provided devices during class time, the project required some work to be completed outside of school. This revealed a digital divide among the students; not all had reliable access to a computer or stable internet connection at home. This disparity created a potential inequity, where some students could not engage with the e-module or collaborate with their groups as effectively outside the classroom, leading to frustration and uneven contributions.

This challenge is not unique to this context and has been identified as a major barrier to the widespread adoption of technology-enhanced learning, particularly in diverse socio-economic settings. Adrianto (2021), in his study on pandemic learning, highlighted how lack of access to technology can exacerbate educational inequalities. This finding serves as a critical reminder that pedagogical innovation must be coupled with systemic support to ensure inclusivity.

A second challenge pertained to time management. Some students, and indeed the teacher, found it difficult to balance the open-ended, inquiry-based nature of the project with the fixed schedule of the school day and other subject demands. Several students reported feeling overwhelmed by the scope of the project and struggled to manage their time effectively between research, collaboration, and creating the final output. This aligns with findings from Hanafi (2019), who emphasized that project-based learning requires and must explicitly teach time management and project planning skills. The teacher in this study attempted to mitigate this by providing structured checkpoints and a more flexible in-class schedule for project work, a strategy supported by research on scaffolding in PBL (Alam, 2022).

In synthesis, the discussion confirms that the theoretical promises of constructivism and PBL are potentiated by the strategic use of interactive digital media. The interactive e-module acted as more than just a

repository of information; it was an interactive, multimodal space that supported exploration, catered to diverse learning styles, and provided the raw materials for knowledge construction. The challenges, while real and impactful, are not insurmountable and point toward necessary areas for systemic and pedagogical intervention rather than flaws in the core approach itself.

CONCLUSION AND IMPLICATIONS

This study concludes that the integration of interactive e-modules within a Project-Based Learning framework presents a highly effective strategy for enhancing the learning of archipelagic cultural diversity in Grade VI elementary school. The approach successfully fostered a significant increase in student engagement, facilitated a deeper and more contextual understanding of complex cultural concepts, and provided a fertile ground for the development of essential collaborative and social skills. The findings robustly support the underlying principles of constructivist and sociocultural learning theories, demonstrating that when students are active agents in their learning, supported by rich, interactive resources and authentic tasks, meaningful educational outcomes are achieved.

However, the study also brings to light critical practical constraints. The issue of uneven technological access threatens the equity and inclusivity of such digital learning initiatives. Furthermore, the implementation requires careful attention to the development of students' self-regulation and time-management skills to prevent them from being overwhelmed by the demands of project work.

The implications of these findings are threefold. First, for educational policymakers and school administrators, there is a pressing need to invest in digital infrastructure and ensure equitable access to devices and reliable internet for all students, both at school and, where possible, through community support programs. Without this foundational support, technology-based innovations risk widening the achievement gap.

Second, for teachers and teacher educators, this study underscores the importance of professional development that focuses not only on technological proficiency but also on pedagogical design for PBL. Teachers need training in creating and curating high-quality interactive e-modules, as well as in strategies for scaffolding student projects, facilitating collaboration, and integrating explicit instruction on time management and project planning into the curriculum.

Finally, for future research, this study opens several avenues for further exploration. Longitudinal studies are needed to assess the long-term impact of this integrated approach on students' 21st-century skills and cultural empathy. Research could also be expanded to evaluate the efficacy of PBL-based e-modules in other subject areas within the elementary curriculum. Furthermore, action research focused on developing and testing specific strategies to overcome the digital divide and support student self-management in project-based environments would be highly valuable.

In essence, the combination of Project-Based Learning and interactive e-modules offers a powerful, innovative pathway for elementary education. By embracing this model and proactively addressing its accompanying challenges, educators can create learning experiences that are not only more engaging and effective but also more relevant to the demands of the digital age and the complex, interconnected world students will inherit.

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