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RIMBA: INTEGRATING SMART PAPER AND DIGITAL TOOLS TO FOSTER POSITIVE LEARNING BEHAVIORS AND ENHANCE LEARNING QUALITY IN ELEMENTARY SCHOOLS

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Abstract

This study examines RIMBA (Ruang Inovasi Media Belajar Atraktif or Attractive Learning Media Innovation Space), an innovative blended learning model designed to foster positive learning behaviors and improve the quality of learning in elementary schools with limited digital resources. The research was conducted at SD Negeri 6 Bukit Tunggal, Palangka Raya, using a qualitative approach with a case study design. The RIMBA model integrates physical Smart Paper media based on local Dayak culture, a simple and accessible digital platform, and a gamified behavior tracking system called "Jejak Si RIMBA" (RIMBA's Footprints). This innovation was developed based on the principles of Deep Learning, which emphasizes meaningful, conscious, and enjoyable learning as a response to learning fatigue, low student participation, and a lack of cultural relevance in learning. Implementation over ten weeks showed a significant increase in student engagement, including increased participation and confidence among previously passive students. The results of behavioral analysis show an average increase of 23% in the aspects of cooperation, responsibility, and discipline, accompanied by an increase in academic achievement and appreciation of local culture. The impact of RIMBA implementation is also reflected in the improvement of the school's Education Report Card score from the "yellow" category to "green" and encourages other teachers to adopt similar innovations. These findings confirm that impactful learning innovations can be realized through contextual, equitable, and adaptive designs without relying on advanced technology.

Keywords: Smart Paper, Digital Tools, Positive Learning Behaviors, Learning Quality

Abstrak

Penelitian ini mengkaji RIMBA (Ruang Inovasi Media Belajar Atraktif), sebuah model pembelajaran blended inovatif yang dirancang untuk menumbuhkan perilaku belajar positif dan meningkatkan kualitas pembelajaran di sekolah dasar dengan keterbatasan sumber daya digital. Penelitian dilakukan di SD Negeri 6 Bukit Tunggal, Palangka Raya, menggunakan pendekatan kualitatif dengan desain studi kasus. Model RIMBA mengintegrasikan media fisik Smart Paper berbasis budaya lokal Dayak, platform digital sederhana yang mudah diakses, serta sistem pelacakan perilaku berbasis gamifikasi "Jejak Si RIMBA". Inovasi ini dikembangkan berdasarkan prinsip Deep Learning yang menekankan pembelajaran bermakna, sadar, dan menyenangkan sebagai respons terhadap kejenuhan belajar, rendahnya partisipasi siswa, dan kurangnya relevansi budaya dalam pembelajaran. Implementasi selama sepuluh minggu menunjukkan peningkatan signifikan pada keterlibatan siswa, termasuk meningkatnya partisipasi dan kepercayaan diri siswa yang sebelumnya pasif. Hasil analisis perilaku menunjukkan peningkatan rata-rata sebesar 23% pada aspek kerja sama, tanggung jawab, dan disiplin, disertai peningkatan capaian akademik serta apresiasi terhadap budaya lokal. Dampak implementasi RIMBA juga tercermin pada peningkatan nilai Rapor Pendidikan sekolah dari kategori "kuning" menjadi "hijau" dan mendorong adopsi inovasi serupa oleh guru lain. Temuan ini menegaskan bahwa inovasi pembelajaran yang berdampak dapat diwujudkan melalui desain yang kontekstual, berkeadilan, dan adaptif tanpa ketergantungan pada teknologi canggih.

Kata kunci: Kertas Cerdas, Alat Digital, Perilaku Belajar Positif, Kualitas Belajar

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INTRODUCTION

Elementary education serves as the foundational pillar for cultivating children's character, skills, and positive learning habits. However, challenges within the elementary learning process frequently impede the achievement of these goals. A recurring issue is low student engagement stemming from monotonous, one-directional instruction (Farmer & Sundberg, 1986). This phenomenon is exacerbated by students' tendency to experience boredom when learning activities are unengaging, repetitive, or fail to actively involve them. Initial observations at SD Negeri 6 Bukit Tunggal, Palangka Raya, revealed that approximately 60% of students exhibited signs of learning boredom, including difficulty maintaining focus, reluctance to participate, and a tendency to disrupt peers during conventional teaching methods.

Conversely, although digital technology has become an indispensable component of modern education, its practical implementation continues to face significant constraints, particularly in resource-limited settings. While this school possesses stable internet access and LCD projectors in every classroom, the number of digital devices such as laptops remains severely limited. Furthermore, school policy restricts student smartphone use to specific times to maintain a balance between digital interaction and face-to-face engagement. This policy, while well-intentioned, has created disparities in participation: students who bring devices tend to be more active, while those without become passive observers. This imbalance presents a critical challenge in designing an inclusive, equitable, and engaging learning environment for all students.

To address these challenges, an innovative pedagogical approach is required—one that strategically integrates the potential of digital technology with simple yet effective non-digital media. In this context, blended learning, which harmonizes digital and non-digital elements, offers a strategic solution. Research by Means et al. (2013) demonstrated that blended learning yields superior learning outcomes compared to purely conventional or fully online methods. Moreover, Hattie (2009) emphasized that methodological and media diversity in instruction constitutes a high-impact factor (effect size = 0.60) on student academic achievement.

The RIMBA innovation (Ruang Inovasi Media Belajar Atraktif—Space for Attractive Learning Media Innovation) emerged as a direct response to these challenges. RIMBA integrates "Smart Paper"; a laminated, reusable physical medium—with interactive digital tools such as Wheel of Names and WordWall. This approach is explicitly designed to support the principles of Deep Learning: Meaningful Learning (connecting knowledge to lived experience), Mindful Learning (cultivating present-moment awareness), and Joyful Learning (fostering positive emotional engagement) (Zull, 2002; Langer, 2000; Fredrickson, 2001). By embedding elements of the local Dayak culture of Central Kalimantan—such as traditional attire, musical instruments, and ancestral motifs—into the design of the Smart Paper, RIMBA enhances the contextual relevance of learning content, enabling students to connect academic knowledge with their social and cultural realities (Gay, 2010).

Previous studies have demonstrated the effectiveness of mixed-media approaches in enhancing motivation and learning behaviors. For instance, Wibowo and Suryani (2021) found that combining digital and print media significantly increased student participation in elementary

schools in remote areas. Similarly, Susilo et al. (2022) confirmed that interactive game-based learning improved students' collaboration, responsibility, and learning enthusiasm. Nevertheless, few innovations have systematically integrated technological tools, local cultural elements, and the cultivation of positive learning behaviors within a single, holistic, and sustainable learning framework—particularly within resource-constrained school contexts.
Therefore, this article presents RIMBA as a successful learning model that has effectively enhanced learning quality and fostered positive learning behaviors at SD Negeri 6 Bukit Tunggal. By strategically integrating Smart Paper with digital tools, RIMBA not only overcomes the constraints of limited infrastructure but also creates an inclusive, meaningful, and joyful learning ecosystem. This article aims to describe the design, implementation, and impact of RIMBA on learning quality and student character development, offering a practical contribution to educators and policymakers in advancing adaptive, locally grounded elementary education.

METHODS

This study employed a qualitative approach with a case study design to explore the implementation and impact of RIMBA (Ruang Inovasi Media Belajar Atraktif), an innovative learning model that integrates Smart Paper and digital tools to foster positive learning behaviors and enhance learning quality in elementary schools. The case study was conducted at SD Negeri 6 Bukit Tunggal, Palangka Raya, Central Kalimantan, Indonesia, focusing on Grade VI students and their classroom interactions during social studies and science lessons. This method was chosen to gain an in-depth understanding of how the integration of physical and digital media influences student engagement, motivation, and behavioral development in a real-world educational setting (Creswell, 2013). On the other hand, this study also observes the cognitive and character changes experienced by learners through their interactions with the learning components that are explored in a straightforward manner (Affandi, 2024).

The primary participants included one classroom teacher (the innovator of RIMBA), 32 students from Grade VI, and three fellow teachers who observed and adopted elements of the innovation. Data were collected through multiple sources to ensure triangulation and enhance credibility. These sources included semi-structured interviews, non-participant classroom observations, and document analysis. Semi-structured interviews were conducted with the lead teacher to understand the design, implementation strategies, and perceived outcomes of RIMBA. Additional interviews were held with peer educators to examine the transferability and adaptability of the model across subjects.

Classroom observations were carried out over a period of ten weeks during regular instructional sessions. Observation notes were systematically recorded using anecdotal records and field notes, focusing on student participation, interaction patterns, emotional responses, and behavioral changes such as cooperation, responsibility, and enthusiasm during RIMBA-based activities. Observations specifically documented moments when students engaged with both digital tools (e.g., Wheel of Names, WordWall) and non-digital components (e.g., laminated Smart Paper, group discussions, and score tracking via Jejak Si RIMBA).

Document analysis included reviewing student assessment sheets, behavior evaluation records, academic performance data before and after RIMBA implementation, and official school reports such as the Rapor Pendidikan (Education Report Card). Additionally, supporting documents such as the copyright registration certificate for the RIMBA innovation, dissemination guides, and the supplementary book Petualangan Si Rimba Vol. 1 were analyzed to contextualize the innovation's development and institutional recognition.

Data analysis followed the interactive model proposed by Miles, Huberman, and Saldana (2014), consisting of three concurrent phases: data reduction, data display, and conclusion drawing. Thematic analysis was used to identify, analyze, and report recurring themes related to student engagement, inclusive learning, cultural relevance, and character development. All data were coded thematically based on the core principles of Deep Learning—Meaningful Learning, Mindful Learning, and Joyful Learning (Zull, 2002; Langer, 2000; Fredrickson, 2001)—to assess how RIMBA supports holistic educational goals.

To ensure trustworthiness, the study applied several qualitative validity measures. Member checking was conducted by sharing preliminary findings with the participating teacher for confirmation. Prolonged engagement in the classroom setting enhanced the depth of observational data, while peer debriefing with other educators contributed to analytical rigor. Furthermore, the integration of local cultural elements—such as Dayak motifs, traditional instruments (e.g., Kecapi), and indigenous values—was examined as a contextual factor that strengthens meaningful connections between curriculum content and students' lived experiences (Gay, 2010).

Although the study is context-specific, the systematic documentation and dissemination efforts—including digital portfolios, Canva-based guides, and interactive game links—support potential replication in similar resource-constrained environments. By combining low-cost physical materials with accessible digital platforms, RIMBA demonstrates a scalable and sustainable model for enhancing elementary education through blended, culturally responsive pedagogy.

RESULTS AND DISCUSSION

Results

The implementation of the RIMBA (Ruang Inovasi Media Belajar Atraktif) model yielded significant improvements in student engagement, learning quality, and behavioral development at SD Negeri 6 Bukit Tunggal, Palangka Raya. Data collected through classroom observations, anecdotal records, behavior assessment sheets, and academic performance reports revealed consistent positive changes across cognitive, affective, and psychomotor domains.

Observational findings indicated a marked reduction in boredom-related behaviors. Prior to RIMBA's implementation, approximately 60% of students exhibited signs of disengagement, such as lack of focus, reluctance to participate, and disruptive peer interactions during conventional instruction. After ten weeks of consistent RIMBA integration, these behaviors decreased significantly. Students demonstrated increased enthusiasm, active participation, and sustained attention throughout lessons. Notably, previously passive students began volunteering answers, engaging in group discussions, and confidently taking on roles such as group scribes or digital operators.

Behavioral assessments highlighted substantial growth in positive learning attitudes. The Jejak Si RIMBA scoring system, which tracks both academic responses and non-academic behaviors like cooperation, responsibility, and sportsmanship, showed an average improvement of 23% compared to the previous semester. Anecdotal records documented instances of mutual assistance, perseverance in problem-solving, and increased self-confidence, particularly among shy or hesitant learners. One notable moment involved a typically quiet student who voluntarily assumed the role of group recorder with visible confidence, signaling a breakthrough in self-expression and peer interaction.

Academically, students demonstrated improved comprehension and performance. Post-implementation test results revealed higher average scores across subjects, particularly in social studies and science, where RIMBA was most frequently applied. Students were better able to connect abstract concepts with real-life contexts, especially when local Dayak cultural elements were integrated into the Smart Paper activities. For instance, matching traditional instruments like the Kecapi or clothing patterns to their functions helped solidify understanding through meaningful, culturally relevant associations.

At the institutional level, RIMBA contributed to broader educational improvements. According to the school's Rapor Pendidikan (Education Report Card), the component for learning quality, previously rated yellow (moderate) during the 2023–2024 period, improved to green (high) in 2025 following the consistent and collaborative application of the innovation. Furthermore, several students achieved recognition in regional competitions, including city-level quizzes (cerdas cermat), traditional dance performances, and science literacy events, reflecting enhanced motivation, confidence, and academic resilience fostered by the RIMBA approach.
The innovation also sparked professional development among teachers. Following dissemination sessions within the school's working groups (kelompok kerja guru), other educators adopted adapted versions of RIMBA in their respective subjects, leading to a more dynamic, collaborative, and creative school-wide teaching culture.

Discussion

The results of this study affirm that integrating simple physical tools like Smart Paper with accessible digital platforms can effectively address common challenges in elementary education, particularly in resource-constrained environments. RIMBA successfully mitigated student boredom by transforming routine learning into an interactive, game-like experience grounded in the principles of Deep Learning: Meaningful, Mindful, and Joyful Learning (Zull, 2002; Langer, 2000; Fredrickson, 2001).

The success of RIMBA aligns with prior research emphasizing the impact of blended and multimodal approaches on student engagement. Means et al. (2013) found that hybrid models combining digital and non-digital elements enhance learning outcomes more than fully online or traditional methods alone. Similarly, Wibowo and Suryani (2021) demonstrated that mixed-media strategies increase participation in remote schools—findings echoed in this study, where the combination of WordWall and laminated Smart Paper ensured equitable involvement regardless of personal device ownership.

Furthermore, RIMBA supports Hattie's (2009) assertion that methodological variation has a high effect size (0.60) on academic achievement. By alternating between digital interactivity (e.g., Wheel of Names, WordWall) and tactile, collaborative tasks (e.g., writing on Smart Paper, tracking progress on Jejak Si RIMBA), the model maintained cognitive stimulation while promoting inclusivity. This balance addressed the inequity caused by limited smartphone access, ensuring all students could participate actively without dependency on personal technology.

The integration of local Dayak cultural elements into the Smart Paper design exemplifies culturally responsive teaching (Gay, 2010), which strengthens students' connections to curriculum content by validating their identities and lived experiences. When students matched cultural artifacts to their meanings, they were not merely memorizing facts but constructing knowledge through familiar contexts—a hallmark of Meaningful Learning. This approach also

nurtured pride in local heritage, fostering socio-emotional development alongside academic growth.

Mindful Learning was cultivated through structured reflection prompts at the beginning and end of each session, encouraging students to articulate their prior knowledge and emotional states. These moments promoted metacognitive awareness, helping students transition from impulsive engagement to intentional, reflective participation (Langer, 2000). Meanwhile, Joyful Learning was realized through gamification—random name selection, team-based challenges, and reward stickers—which transformed classrooms into vibrant, emotionally positive spaces (Fredrickson, 2001).

Importantly, RIMBA demonstrates scalability and sustainability. Unlike high-cost technological solutions, it leverages low-cost, reusable materials and free digital tools, making it feasible for replication in similar settings. Its formal recognition through copyright registration and documentation in supplementary books like Petualangan Si Rimba Vol. 1 further enhances its potential for wider adoption and long-term impact.

While context-specific, the model offers transferable insights: innovation in education does not require advanced technology but rather thoughtful design that centers student needs, equity, and cultural relevance. As Susilo et al. (2022) noted, game-based learning fosters responsibility and collaboration—outcomes clearly observed in the improved behavioral metrics and group dynamics under RIMBA.

CONCLUSION

This study demonstrates that the RIMBA model that integrating Smart Paper with digital tools such as WordWall and Wheel of Names—is an effective, inclusive, and sustainable approach to enhancing elementary education in resource-limited settings. By addressing key challenges such as student boredom, unequal access to technology, and the need for holistic character development, RIMBA fosters a learning environment that is meaningful, mindful, and joyful. The innovation significantly improved student engagement, academic performance, and positive learning behaviors, as evidenced by observational data, behavioral assessments, and institutional reports. Moreover, its impact extended beyond individual classrooms, contributing to elevated school-wide learning quality and inspiring professional collaboration among teachers.

RIMBA underscores the importance of teacher-led innovation in bridging the gap between digital possibilities and practical realities in education. It proves that transformative change begins not with sophisticated gadgets, but with empathetic pedagogy, creative resourcefulness, and cultural affirmation. For educators and policymakers seeking scalable models to improve elementary education, particularly in underserved regions, RIMBA offers a replicable framework that balances technology, tradition, and human-centered design.

Future efforts should focus on expanding RIMBA's application across grade levels and subjects, as well as supporting its dissemination through teacher training programs and open-access digital repositories. Continued documentation and evaluation will ensure its evolution as a living innovation, adaptable to diverse educational contexts while remaining rooted in the principles of equity, engagement, and empowerment.

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