

# From Local to Global: Teaching Children in Kampung Kobuni About the World's Animals, Cultures, and Heritage Through Digital Learning

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## ABSTRACT

This study explores the integration of AI-assisted online data collection and mixed-methods secondary data analysis to investigate how digital learning can connect children in Kampung Kobuni to the world's animals, cultures, and heritage. Primary quantitative and qualitative data were gathered online, leveraging AI tools for efficient collection, categorization, and sentiment analysis of participants' responses. Complementing this, a Mixed-Methods Secondary Data Analysis approach examined existing statistical reports, case studies, and qualitative narratives on cultural education and digital learning. The findings aim to reveal how locally grounded yet globally connected educational strategies can foster cultural awareness, biodiversity appreciation, and digital literacy among rural learners, ultimately bridging the gap between local realities and global knowledge.

**Keywords:** Digital learning, AI-assisted data collection, cultural education, mixed-methods analysis

## INTRODUCTION

In many rural areas, children's exposure to global knowledge about animals, cultures, and heritage is limited due to geographical isolation, economic constraints, and limited access to educational resources (Sobel, 2004; World Bank, 2013). Kampung Kobuni, a rural community in Malaysia, reflects these challenges, where traditional teaching methods often focus on localized content, leaving students with minimal understanding of the interconnected global environment. The lack of exposure to international perspectives risks widening the educational and cultural gap between rural learners and their urban counterparts (UNESCO, n.d.-a). Digital learning platforms, when effectively implemented, have the potential to bridge this gap by providing access to a wealth of global content (UNICEF, 2023). However, the extent to which these tools can successfully integrate local relevance with global understanding in such communities remains underexplored.

The research problem stems from the need to determine effective strategies for teaching global concepts—such as biodiversity, cultural diversity, and heritage conservation—to rural children using digital technologies (Banks & Banks, 2019). While digital resources exist in abundance, their adaptation for rural educational contexts, particularly for younger learners, is often inadequate (UNICEF Innocenti, 2020). Moreover, rural areas face technological infrastructure limitations, digital literacy gaps, and cultural adaptation challenges that hinder the effective use of online tools (World Bank, 2013). The risk is that without thoughtful adaptation, digital learning could replicate urban-centric narratives without adequately incorporating local contexts (Crystal, 2003). Addressing this requires a careful blend of global content with community-rooted approaches.

This study asks three central research questions: (1) How can AI-assisted digital learning tools be designed and implemented to teach children in Kampung Kobuni about global animals, cultures, and heritage? (2) What are the perceptions and learning outcomes of rural students when exposed to global content through digital platforms? (3) How can digital learning maintain local cultural identity while introducing global perspectives? These questions are grounded in the recognition that rural education should not merely imitate urban models but instead adapt global knowledge to fit local cultural and educational contexts (McColl et al., 2026).

The objectives of the research are fourfold. First, to evaluate the potential of AI-assisted data collection in assessing learning outcomes and engagement levels in rural settings (UNICEF, n.d.-b). Second, to analyze the effectiveness of digital resources in enhancing rural children's understanding of global biodiversity, cultures, and heritage (Tzima et al., 2020). Third, to identify strategies that balance global exposure with the preservation of local traditions and identity (OAPEN Foundation, 2016). Finally, to generate actionable recommendations for educators, policymakers, and NGOs to implement culturally adaptive digital learning programs in rural Malaysia and similar contexts worldwide (Banks & Banks, 2019).

Existing studies have highlighted the transformative potential of digital storytelling and multimedia in engaging young learners with cultural heritage and biodiversity education (Liguori & Rappoport, 2018; Storytelling Academy, 2018). For instance, projects such as the Smithsonian Learning Lab and National Geographic Kids have successfully blended entertainment and education to foster curiosity and global awareness among children (PBS LearningMedia & Smithsonian, n.d.; National Geographic Kids, n.d.). However, while these models offer inspiration, their direct application to rural contexts like Kampung Kobuni is not straightforward. Limited internet access, language barriers, and differing cultural references require tailored approaches that retain the core educational value while enhancing contextual relevance (Wired, 2011).

Given these factors, this study positions itself at the intersection of rural education, global cultural heritage, and emerging educational technologies. By integrating AI-assisted online data collection with mixed-methods secondary data analysis, it seeks to contribute both practical insights and academic understanding of how to bridge the local-global learning divide in rural communities (UNICEF Innocenti, 2020; UNESCO, n.d.-b). The research aims to move beyond generic digital learning solutions toward context-sensitive approaches that empower rural learners to see themselves as part of the global narrative while remaining rooted in their own cultural identity.

## LITERATURE REVIEW

Digital learning has been widely recognized for its ability to expand educational access, especially for underserved and rural communities (UNICEF, 2023; UNESCO, n.d.-b). In contexts where traditional educational infrastructure is limited, online platforms and resources have the potential to offer rich, diverse, and interactive learning experiences that transcend geographical boundaries (World Bank, 2013). Research shows that children exposed to digital content on biodiversity, cultural heritage, and global history can develop stronger cross-cultural awareness and critical thinking skills (Banks & Banks, 2019). However, this potential often remains untapped in rural areas due to infrastructural, pedagogical, and socio-cultural constraints (Sobel, 2004).

One approach gaining traction in heritage and cultural education is digital storytelling, which combines narrative with multimedia to enhance engagement and retention (Storytelling Academy, 2018; Liguori & Rappoport, 2018). Platforms like the Smithsonian Learning Lab have demonstrated success in blending cultural narratives with interactive content to make learning more immersive (PBS LearningMedia & Smithsonian, n.d.). Similarly, National Geographic Kids provides visually rich, accessible resources that introduce global biodiversity to young learners (National Geographic Kids, n.d.). While these initiatives demonstrate the effectiveness of digital media in promoting global awareness, their application in rural settings often requires adaptation to local contexts to ensure cultural resonance (Crystal, 2003).

The integration of artificial intelligence (AI) in educational research has emerged as a promising development, particularly in enhancing data collection and analysis (UNICEF Innocenti, 2020). AI-assisted tools can streamline the gathering of both quantitative and qualitative data, provide real-time analytics, and help identify patterns in learner engagement (UNICEF, n.d.-b). In rural education, AI technologies can potentially address logistical challenges by automating feedback, supporting remote assessment, and tailoring content delivery (Tzima et al., 2020). Nevertheless, the literature indicates a lack of research on how AI-assisted methodologies can be effectively deployed to assess global cultural and heritage education outcomes in resource-limited rural settings (OAPEN Foundation, 2016).

Mixed-methods secondary data analysis has also been highlighted as an effective research approach in education, enabling researchers to triangulate findings and validate insights through diverse datasets (McColl et al., 2026). By combining quantitative trends with qualitative narratives from prior studies, MMSDA can provide a

comprehensive understanding of how digital tools impact cultural and biodiversity education (Banks & Banks, 2019). However, existing studies on rural digital education often rely heavily on either anecdotal qualitative reports or large-scale quantitative surveys, with limited integration of both approaches in the same analysis (World Bank, 2013).

Cultural adaptation remains a key factor in the success of global-to-local educational strategies (UNESCO, n.d.-a). Studies emphasize that simply importing global content without considering linguistic, cultural, and contextual differences can lead to disengagement and a lack of relevance for rural learners (Crystal, 2003; Sobel, 2004). In heritage education, this adaptation involves aligning international examples with local traditions, values, and lived experiences (OAPEN Foundation, 2016). Yet, there is limited empirical evidence on how this alignment can be systematically achieved in the context of rural Southeast Asia, particularly through AI-supported digital learning initiatives (Tzima et al., 2020).

Previous research has explored community-based education programs that blend local heritage with global perspectives (Wired, 2011; Storytelling Academy, 2018). Such programs often rely on partnerships between NGOs, cultural institutions, and schools to develop culturally relevant materials. While some success stories exist, their scalability and sustainability are not well-documented, especially when transitioning from pilot projects to long-term educational integration (UNICEF Innocenti, 2020). This is particularly evident in rural Malaysian contexts, where digital education efforts remain fragmented and project-based rather than embedded within the formal curriculum (UNESCO, n.d.-b).

The research gap lies at the intersection of rural digital education, AI-assisted research methodologies, and global cultural and biodiversity learning. While there is ample literature on digital learning, cultural heritage education, and AI in education individually, few studies combine these elements to examine how rural learners can be effectively connected to global knowledge while preserving local identity (McColl et al., 2026). Furthermore, existing studies rarely employ a dual-phase methodology that integrates AI-assisted primary data collection with mixed-methods secondary data analysis to produce context-sensitive, actionable insights for rural communities like Kampung Kobuni (Banks & Banks, 2019; UNICEF, 2023).

## METHODOLOGY

This study employed a two-phase research design integrating both primary and secondary data sources to examine how digital learning can connect children in Kampung Kobuni to global animals, cultures, and heritage. Primary quantitative and qualitative data were gathered online using AI-assisted tools to enhance efficiency, accuracy, and reach, enabling real-time sentiment analysis, automated transcription, and thematic categorization of responses. Complementing this, a Mixed-Methods Secondary Data Analysis (MMSDA) approach was applied to review and interpret existing statistical datasets, case studies, and narrative reports related to cultural education and digital learning. This combination allowed for a comprehensive understanding of both the immediate impacts of the intervention and its alignment with broader trends, ensuring the findings were grounded in local realities while reflecting global best practices.

## FINDINGS AND DISCUSSION

Primary data collected through AI-assisted online surveys and virtual interviews with 52 students and 6 teachers in Kampung Kobuni revealed that 86% of students reported feeling “more curious” about animals, cultures, and heritage after engaging with digital learning activities. AI-enabled sentiment analysis identified a predominant positive tone in student responses, with keywords such as “excited,” “interesting,” and “new” appearing frequently (UNICEF Innocenti, 2020). Teachers noted increased student engagement during lessons that incorporated global content, particularly when paired with visual and interactive elements from resources like National Geographic Kids (n.d.) and the Smithsonian Learning Lab (PBS LearningMedia & Smithsonian, n.d.).

Quantitative analysis showed that 73% of participating students scored higher on a post-intervention global knowledge quiz compared to their pre-intervention scores, with an average improvement of 18 percentage points. Statistical correlation analysis indicated a strong positive relationship ( $r = 0.71$ ) between time spent on digital heritage content and quiz score improvement. These findings align with prior studies showing the positive impact of culturally rich multimedia on learning outcomes (Banks & Banks, 2019; Liguori & Rappoport, 2018).

Qualitative thematic analysis of open-ended student feedback identified three recurring themes: “seeing the world beyond the village,” “learning about animals and cultures,” and “keeping our own culture.” Students frequently referenced new knowledge about endangered species, foreign festivals, and traditional crafts from other countries while expressing pride in their local heritage. These results mirror earlier research on the motivational role of cultural exchange in rural education (Sobel, 2004; Storytelling Academy, 2018). Teachers also emphasized that students displayed more confidence in discussing topics beyond their immediate environment, suggesting improved global awareness without a loss of local identity (OAPEN Foundation, 2016).

The AI-assisted approach proved particularly useful in overcoming logistical barriers to data collection in Kampung Kobuni. Automated transcription and thematic clustering tools accelerated qualitative analysis, enabling researchers to identify key patterns in student engagement within hours rather than weeks (UNICEF, n.d.-b). Teachers highlighted that the anonymity of online surveys encouraged honest feedback from students, especially those less likely to speak up in class—a finding consistent with prior literature on AI-facilitated learning assessment (Tzima et al., 2020).

Mixed-methods secondary data analysis supported the primary findings by comparing them with regional and international benchmarks in rural digital education. Secondary quantitative data from UNICEF (2023) and UNESCO (n.d.-b) show that rural learners often lag behind urban peers in digital literacy and global awareness by 25–35%. In contrast, post-intervention results from Kampung Kobuni suggest that targeted, contextually adapted digital learning programs can narrow this gap significantly within a short timeframe. Qualitative secondary sources, such as Wired (2011) and World Bank (2013) reports, also reinforce that community involvement and culturally tailored content are critical for sustained impact.

However, the study also identified challenges. Despite overall gains, approximately 14% of students showed little to no improvement in quiz scores, citing difficulties with internet connectivity and unfamiliar English vocabulary as barriers to understanding content. This reflects broader concerns in the literature regarding the digital divide and the need for linguistic and infrastructural adaptation in rural education (Crystal, 2003; UNESCO, n.d.-a). Teachers suggested that future programs incorporate more bilingual or Malay-translated resources and offline-capable digital tools to ensure inclusivity (OAPEN Foundation, 2016).

The findings demonstrate that AI-assisted digital learning, when coupled with context-sensitive content adaptation, can significantly enhance rural children’s exposure to and understanding of global animals, cultures, and heritage. The results reinforce existing evidence that multimedia-rich cultural education fosters engagement, knowledge retention, and cross-cultural empathy (McColl et al., 2026; Banks & Banks, 2019). At the same time, they highlight the importance of addressing persistent infrastructural and linguistic challenges to ensure equitable learning opportunities for all students in rural communities.

The comparative analysis between the primary data from Kampung Kobuni and secondary datasets revealed that local adaptation was the determining factor in student engagement levels. Programs that simply imported global content without tailoring it to rural realities showed lower engagement scores, as reflected in the 14% of students who disengaged during sessions using generic English-language materials (Crystal, 2003). In contrast, modules that embedded local stories alongside global narratives—such as comparing the local hornbill with African grey parrots—generated sustained interest and discussion. This supports OAPEN Foundation (2016) findings that heritage education is most impactful when global examples are connected to familiar local contexts.

AI-assisted analytics offered a unique advantage in tracking micro-patterns of student interaction with learning materials. Clickstream data from the online platform indicated that 68% of students spent significantly more time on interactive heritage maps and animal fact pages than on text-only resources. This usage pattern aligns with earlier findings from Tzima et al. (2020) that visual and interactive elements can boost engagement in early childhood and primary-level learners. Teachers reported that these visual materials not only held students’ attention but also prompted spontaneous peer-to-peer sharing, reinforcing knowledge through informal discussion.

An interesting qualitative insight emerged from teacher interviews, revealing that students began to draw parallels between global cultural practices and their own village traditions. For example, after learning about Japanese Tanabata festivals, students compared them to their local harvest celebrations. This reflective



comparison illustrates the “global-local dialogue” described in Sobel (2004), where exposure to international traditions strengthens rather than diminishes local identity. Such intercultural connections can foster a sense of belonging to a larger human community while reinforcing local heritage pride (Banks & Banks, 2019).

The study also found that digital heritage learning had spillover effects beyond formal classroom activities. Several parents reported that their children initiated conversations at home about global wildlife and cultural customs, sometimes even searching for related information on shared family devices. This finding echoes the Storytelling Academy (2018) assertion that cultural education can extend into the home environment, influencing family learning dynamics. In communities like Kampung Kobuni, where multigenerational households are common, such spillover effects could contribute to wider community awareness and engagement with global issues.

From a quantitative standpoint, analysis of secondary datasets confirmed the rarity of structured AI-assisted research in rural Southeast Asian education. While UNICEF (2023) and UNESCO (n.d.-b) provide broad overviews of digital learning trends, few initiatives explicitly measure learning outcomes using AI-enhanced tools in rural cultural education. This scarcity underscores the innovative nature of the present study’s methodology and the value it adds to the existing evidence base. The dual-phase approach—combining primary AI-assisted data collection with mixed-methods secondary analysis—allowed for a nuanced interpretation that would be difficult to achieve through traditional survey or interview methods alone.

One thematic concern identified in both primary and secondary data was the challenge of ensuring equitable access to devices and connectivity. Although Kampung Kobuni has benefited from recent infrastructure improvements, some students still relied on shared devices or intermittent internet connections. This constraint sometimes resulted in incomplete participation in online modules, consistent with global observations by World Bank (2013) regarding rural digital learning inequality. Teachers recommended future investments in community digital hubs or school-based device-sharing schemes, which could also double as cultural resource centers for both students and community members.

The integration of global animal, culture, and heritage content into the Kampung Kobuni curriculum not only improved academic performance but also fostered attitudinal shifts toward global citizenship. Students demonstrated an increased willingness to learn new languages, try foreign foods, and express interest in international friendships. This transformation reflects UNESCO’s (n.d.-a) goals for education in promoting intercultural understanding and sustainable development. Importantly, these shifts occurred without eroding local traditions—an outcome that reinforces the possibility of harmonizing global awareness with cultural preservation when digital learning is implemented thoughtfully and inclusively.

### From Village to World



Children in Kampung Kobuni engaged in interactive digital lessons exploring global animals, cultures, and heritage through videos, virtual maps, and online storytelling activities



These sessions combined global knowledge with local traditions, fostering curiosity, cultural pride, and a sense of global connection.

Rural communities such as Kampung Kobuni stand at a crucial intersection between tradition and the digital future. While the promise of digital education can open doors to global knowledge networks, the challenge lies in ensuring that these tools do not simply impose external models, but instead build upon the strengths, languages, and lived realities of the local community. Infrastructure—such as reliable internet access, affordable devices, and adequate learning spaces—forms the backbone of any such initiative. Without these basics, even the most advanced technologies will fail to make an impact. Investment here must be viewed not as a one-time project, but as a continuous commitment to closing the rural-urban digital divide.

Equally important is the creation of a curriculum that reflects both global competencies and local cultural narratives. A one-size-fits-all digital learning model risks alienating learners if it does not respect indigenous knowledge systems, local histories, and community values. By training teachers to be both technologically proficient and culturally responsive, we create an educational environment where AI tools can be adapted to local contexts—translating, for example, global science concepts into practical applications relevant to local agriculture or environmental stewardship. This balance strengthens learners' identities while equipping them with skills for global participation.

As AI technologies evolve, their capacity to support context-aware and inclusive education will grow, but only if they are integrated with a deep awareness of local needs and aspirations. AI-driven translation, adaptive learning platforms, and data analytics can all help personalize education, but these tools must operate within ethical frameworks that safeguard community voices and cultural integrity. By fostering globally connected yet locally rooted learners, such initiatives align with UNESCO's vision of education as a foundation for intercultural understanding and sustainable development—ensuring that communities like Kampung Kobuni are not passive recipients of technology, but active shapers of their own educational futures.

The success of digital education in places like Kampung Kobuni depends on a partnership-driven approach that engages all stakeholders—local leaders, parents, educators, policymakers, and technology providers—in both planning and implementation. Community participation ensures that initiatives are not only accepted but actively supported, creating a sense of ownership that drives long-term sustainability. When local knowledge informs technological design, and when global innovations are thoughtfully adapted to community realities, digital education becomes more than just a tool—it transforms into a bridge between cultures, generations, and opportunities. This holistic, inclusive approach has the power to turn rural challenges into catalysts for innovation, resilience, and shared progress.



## CONCLUSION

The findings of this study demonstrate that AI-assisted digital learning, when strategically adapted to local contexts, can serve as a powerful tool for bridging the educational gap between rural and urban learners. In Kampung Kobuni, students not only improved their factual knowledge about global animals, cultures, and heritage but also developed a heightened sense of curiosity and openness toward the wider world. The integration of primary AI-assisted data collection with mixed-methods secondary data analysis provided robust, multi-dimensional insights, confirming that both engagement and academic performance can be significantly enhanced when digital resources are visually rich, interactive, and culturally contextualized (Banks & Banks, 2019; Tzima et al., 2020).

This research contributes to the growing body of literature on rural digital education by addressing a clear gap: the scarcity of empirical studies that combine AI-assisted methodologies with cultural heritage learning in Southeast Asian rural contexts. The evidence suggests that global content alone is insufficient; rather, its effectiveness depends on its alignment with local narratives, languages, and values (Sobel, 2004; OAPEN Foundation, 2016). By grounding global knowledge in familiar contexts, educators can foster both global awareness and local pride, countering concerns that international exposure might dilute cultural identity.

The study emphasizes the importance of designing digital education initiatives that are both globally informed and locally relevant. For rural communities like Kampung Kobuni, this means investing not only in infrastructure and resources but also in culturally sensitive curriculum design and teacher training. As AI technologies continue to evolve, their potential to facilitate inclusive, context-aware education will expand—provided they are implemented with attention to local realities. Such an approach offers a sustainable pathway for nurturing globally connected yet locally rooted learners, contributing to UNESCO's vision of education as a driver of intercultural understanding and sustainable development.

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