

Strengthening Edu-Tourism Literacy Facilities at the Rammang-Rammang Floating Library through Contextual Numeracy, Cultural Storytelling, and Pentahelix-Based Community Management

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ABSTRACT

This community service program aimed to strengthen edu-tourism literacy facilities at the Rammang-Rammang Floating Library through the integration of contextual numeracy, cultural storytelling, and Pentahelix-based community management. The program was implemented using a participatory approach involving five key stakeholder groups: academia, government, business, community, and media. The implementation process consisted of three stages: needs assessment and stakeholder mapping, development of edu-tourism literacy facilities, and training and mentoring for collaborative implementation. Data were collected through observations, interviews, focus group discussions, and stakeholder consultations to identify local needs and opportunities for literacy enhancement. The program produced contextual numeracy worksheets based on local tourism activities, cultural storytelling materials documenting local heritage and oral traditions, and improved library management systems supported by digital promotional content. The results indicate that the program successfully increased access to literacy resources, strengthened numeracy learning through authentic tourism-related contexts, and enhanced community engagement in preserving local culture through storytelling activities. Community-academic-media collaboration contributed significantly to the documentation, dissemination, and promotion of cultural narratives, while government and business support improved organizational capacity, resource availability, and operational sustainability. The implementation of the Pentahelix model facilitated stakeholder synergy, knowledge transfer, and shared responsibility, creating a supportive ecosystem for sustainable edu-tourism development. Furthermore, digitalization initiatives expanded the reach of educational resources and cultural content through online platforms and social media. Overall, the program transformed the Floating Library into a dynamic learning environment that integrates literacy, culture, tourism, and community empowerment. The findings demonstrate that contextual learning, cultural preservation, and multi-stakeholder collaboration can effectively strengthen community-based literacy facilities and provide a replicable model for sustainable edu-tourism development in rural tourism destinations.

Keywords: Edu-tourism literacy; Floating library; Contextual numeracy; Cultural storytelling; Pentahelix collaboration

INTRODUCTION

Village tourism is increasingly seen as an effective edu-tourism space that combines educational experiences with local cultural, environmental, and social assets. Rammang-Rammang, known for its unique natural scenery and strong community traditions, has significant potential to serve as a practical learning environment where literacy activities go beyond traditional classrooms. Educational tourism focuses on experiential learning, allowing visitors and locals to acquire knowledge through direct engagement with their surroundings. Studies have shown that tourism villages can act as 'learnsapes,' promoting learning via participation in local culture, traditional architecture, community practices, and environmental resources (Widodo et al., 2024). Additionally, educational tourism can enhance environmental awareness and sustainability by offering authentic, locally rooted learning experiences (Prihandini et al., 2025; Malavé-Hernández & Carrión-Mero, 2025). Community-based tourism also helps preserve knowledge and foster intergenerational learning by involving locals in educational activities and cultural transmission (Widayati et al., 2024). Therefore, village tourism provides a valuable platform to blend literacy development with meaningful educational experiences that connect people to their cultural and environmental heritage.

Within this context, the Rammang-Rammang Floating Library is a strategic facility for enhancing edu-tourism literacy by integrating reading activities, contextual numeracy, and cultural storytelling. As a community-based literacy hub, the floating library can provide visitors and residents with opportunities to explore local knowledge while developing essential literacy skills. Libraries in tourism villages have proven effective in supporting community learning, access to information, and social resilience, particularly when they function as collaborative educational spaces that serve diverse community needs (Reindrawati et al., 2021). The educational value of such facilities can be further strengthened through collaborative governance involving multiple stakeholders. Recent studies highlight the importance of stakeholder engagement, digital literacy development, and cross-sector collaboration in ensuring the sustainability and effectiveness of edu-tourism initiatives (Rumanti et al., 2025; Wahyuni et al., 2025; Suhud, Allan et al., 2026; Sihotang, 2026). Therefore, by combining literacy programs with contextual learning content and community participation, the Rammang-Rammang Floating Library has the potential to become a sustainable edu-tourism literacy space that promotes educational enrichment, cultural preservation, and community empowerment.

The establishment of a floating library within a village tourism setting presents several facility-related challenges that may affect its effectiveness as an edu-tourism literacy space. Unlike conventional libraries, floating libraries operate in environments that are directly influenced by water dynamics, weather conditions, and environmental changes. Structural stability is a critical concern because floating facilities must remain safe and functional despite the impact of wind, waves, fluctuating water levels, and visitor movement. Research on floating structures emphasises that stability assessments are essential to ensure operational safety and user comfort under varying environmental conditions (Karczewski, 2022). In addition, floating facilities must be designed to withstand long-term environmental pressures, including climate variability, flooding, pollution, and other ecological disturbances that may affect the durability of infrastructure and service continuity (Wang & Wang, 2020). Beyond structural concerns, limited physical space poses additional challenges for organising reading collections, learning materials, and community activities. Effective spatial planning is therefore necessary to accommodate educational functions while maintaining accessibility and comfort for users (Spencer, 2006). These challenges highlight the need for adaptive facility design that balances educational objectives with environmental resilience and operational practicality.

In addition to physical infrastructure constraints, managing a floating library entails complex organisational and resource-related challenges. Educational resources must be systematically organized, maintained, and made accessible to diverse user groups despite limitations in storage capacity and technological infrastructure. Libraries increasingly face challenges associated with resource management, particularly in balancing physical collections with digital information services and ensuring long-term accessibility of educational materials (Anderson, 2009). The growing demand for digital literacy and online learning further requires libraries to integrate electronic resources and technology-based learning platforms, which often necessitate adequate infrastructure, funding, and trained personnel (Lowe et al., 2021). Moreover, libraries are expected to support evolving educational needs by facilitating access to digital learning ecosystems and online educational content,

requiring continuous adaptation of management practices and service delivery models (Liao et al., 2022). Within a village tourism context, these managerial challenges are compounded by the need to ensure that literacy programs, contextual numeracy activities, and cultural storytelling initiatives remain relevant to local communities. Consequently, sustainable floating library management requires not only efficient resource administration but also strong stakeholder collaboration and continuous capacity development.

The development of edu-tourism literacy initiatives increasingly requires collaborative governance mechanisms capable of integrating educational objectives, tourism development, community participation, and sustainable resource management. In this regard, the Pentahelix approach, which emphasizes collaboration among academia, government, business sectors, communities, and media, has emerged as a strategic framework for addressing the complex challenges faced by tourism-based educational programs. Village tourism destinations often require coordinated efforts to develop infrastructure, educational content, promotional strategies, and community capacity-building programs. Recent studies demonstrate that Pentahelix collaboration contributes significantly to sustainable tourism village development by fostering stakeholder synergy, strengthening institutional support, and aligning local initiatives with broader sustainable development objectives (Setyo et al., 2025). Furthermore, inclusive stakeholder engagement enables local communities to participate actively in decision-making processes, ensuring that tourism and educational initiatives reflect local needs, aspirations, and cultural values (Azwar et al., 2025). The governance dimension of the Pentahelix model also supports transparent communication, equitable resource allocation, and long-term sustainability, all of which are critical for maintaining literacy-based tourism programs (Subair et al., 2025). Consequently, the application of the Pentahelix approach is increasingly viewed as an urgent necessity rather than an optional strategy in strengthening edu-tourism literacy initiatives within village tourism destinations.

The urgency of the Pentahelix approach is further reinforced by the need to integrate contextual learning experiences that combine literacy development, cultural preservation, and community empowerment. Edu-tourism literacy programs are most effective when they leverage local cultural assets, storytelling traditions, and authentic learning environments to enhance participant engagement and learning outcomes. Storytelling, for example, has been recognized as a powerful educational tool that deepens cultural immersion and creates meaningful emotional connections between visitors and local communities (Khater et al., 2026). Similarly, tourism-based educational activities have demonstrated their potential to support environmental education and experiential learning through direct engagement with local contexts (Prihandini et al., 2025). The inclusion of contextual numeracy is equally important because literacy development in tourism settings should encompass practical problem-solving skills that are relevant to everyday community and tourism activities. Comparative studies on numeracy literacy emphasize the importance of contextualized learning experiences in improving learners' ability to apply mathematical concepts to real-life situations (Syamsuddin et al., 2025). Moreover, storytelling-based educational environments have been found to enhance knowledge retention and reflective learning by connecting personal experiences with cultural narratives (Paddison & Walmsley, 2021). Therefore, the Pentahelix approach provides an essential collaborative framework for integrating these educational dimensions while ensuring the sustainability, relevance, and broader societal impact of edu-tourism literacy programs.

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Methods of Pentahelix-Based Community Service Implementation

Needs Assessment and Mapping of Pentahelix Stakeholders

The implementation of the community service program began with a comprehensive needs assessment and stakeholder mapping process to identify the existing conditions, challenges, and opportunities for strengthening edu-tourism literacy at the Rammang-Rammang Floating Library. Data collection was conducted through field observations, interviews, focus group discussions, and consultations with library managers, local communities, tourism actors, and village authorities. The assessment focused on identifying gaps in literacy facilities, educational resources, community participation, and institutional support. Subsequently, stakeholder mapping was carried out to classify actors according to their interests, influence, and potential contributions to the program. The mapping process involved the identification of key stakeholders representing the five elements of the Pentahelix model, namely academia, government, business sectors, communities, and media. Previous studies emphasize that stakeholder mapping is essential for understanding governance structures, stakeholder dynamics, and collaborative opportunities within tourism development initiatives (Kefale et al., 2026; Cita et al., 2025). Furthermore, effective Pentahelix collaboration requires transparent communication, participatory decision-making, and alignment of stakeholder objectives to achieve sustainable outcomes (Setyo et al., 2025; Subair et al., 2025). Therefore, the needs assessment and stakeholder mapping stage served as a foundation for designing intervention strategies that were responsive to local conditions and supported by relevant stakeholders.

Development of Edu-Tourism Literacy Facilities

Following the assessment stage, the program focused on developing edu-tourism literacy facilities that integrated contextual numeracy, cultural storytelling, and community-based learning. The development process involved the creation of literacy resources and learning media tailored to the unique environmental and cultural characteristics of Rammang-Rammang. These outputs included contextual numeracy worksheets, storytelling booklets, educational posters, tourism interpretation materials, library catalog systems, visitor learning guides, and digital promotional content. The educational materials were designed to incorporate local cultural narratives, environmental knowledge, tourism activities, and everyday community experiences to enhance learning relevance and engagement. Research has shown that educational tourism is most effective when learning resources are contextualized and connected to local cultural and environmental assets (Prihandini et al., 2025). Similarly, the incorporation of traditional knowledge and cultural elements into tourism-based

learning activities can strengthen visitor engagement while supporting cultural preservation efforts (Irfan et al., 2023). To improve accessibility and learning effectiveness, digital and multimedia-based materials were also developed as complementary educational resources (Rahman et al., 2019; Tsai & Lee, 2005). Additionally, sustainability principles were integrated into facility development to ensure long-term community benefits and efficient resource utilization (Lestari et al., 2026).

Training, Mentoring, and Collaborative Implementation

The final stage involved training, mentoring, and collaborative implementation activities aimed at strengthening stakeholder capacity and ensuring the sustainability of the developed literacy facilities. Training programs were delivered to library managers, volunteers, community members, tourism actors, and youth groups, focusing on literacy facilitation, contextual numeracy instruction, cultural storytelling techniques, digital literacy, and library management. These activities were designed to enhance participants' competencies and encourage active involvement in managing edu-tourism literacy initiatives. Previous studies indicate that stakeholder capacity building plays a critical role in improving collaboration, communication, and organizational performance within edu-tourism programs (Rumanti et al., 2025). Furthermore, partnerships between academic institutions and community stakeholders contribute significantly to knowledge transfer and the practical application of innovative educational approaches (Sufi et al., 2025). Alongside training activities, mentoring was conducted through regular consultations, hands-on practice sessions, and participatory learning activities to facilitate the implementation of acquired knowledge. Mentoring approaches have been found to strengthen experiential learning outcomes, participant confidence, and community ownership of development initiatives (Wang et al., 2023). Collaborative implementation was further supported through literacy campaigns, storytelling events, educational tourism activities, and digital promotion initiatives involving all Pentahelix actors. Such participatory and experiential approaches are aligned with contemporary educational frameworks that emphasize leadership development, stakeholder engagement, and sustainable community empowerment (Kumar, 2025).

RESULTS AND DISCUSSION

One of the primary outcomes of the community service program was the development of contextual numeracy worksheets designed to strengthen numeracy literacy through learning activities closely connected to the environmental, cultural, and tourism characteristics of Rammang-Rammang. The need for such materials emerged from field observations and interviews indicating that the floating library possessed limited educational resources related to numeracy and local tourism contexts. Existing collections mainly consisted of general educational books, while learning media specifically addressing local culture, tourism, and numeracy remained scarce. To address this gap, a series of contextual numeracy worksheets were developed by integrating mathematical concepts with authentic situations found in the Rammang-Rammang tourism area, such as boat transportation distances, travel duration, visitor statistics, ticket pricing, local economic activities, and environmental conservation practices. This approach was intended to help learners connect abstract mathematical concepts with real-life experiences, thereby increasing engagement and comprehension. Previous studies have demonstrated that contextual learning significantly improves numeracy literacy by enabling learners to solve mathematical problems embedded in familiar situations and everyday experiences (Syamsuddin et al., 2025). Furthermore, contextual numeracy becomes more effective when supported by culturally relevant learning materials that reflect local knowledge and community practices (Kusmanto et al., 2025). The development process also involved consultation with local stakeholders to ensure that the learning content accurately represented the social and environmental realities of the destination, consistent with community-based educational approaches that emphasize co-creation and local participation (Morrison et al., 2026).

The resulting worksheets incorporated a variety of learning activities, including data interpretation, measurement, estimation, comparison, and problem-solving exercises related to tourism and community life in Rammang-Rammang. Learners were encouraged to analyze visitor data, calculate travel costs, estimate distances between tourism sites, and interpret environmental information through numeracy-based tasks. Such activities align with educational tourism principles that promote experiential learning and the integration of

academic knowledge with local contexts (Wulandari et al., 2024). In addition, the worksheet design adopted interactive and visual elements inspired by contemporary digital learning approaches, enabling future adaptation into multimedia or technology-enhanced formats. Research has shown that digital and augmented reality-based educational tools can strengthen numeracy literacy by linking mathematical concepts with authentic physical environments and encouraging active learner participation (Hendrik et al., 2026). Similarly, structured numeracy tasks modeled on real-world problem-solving frameworks have been found to improve learners' mathematical reasoning and confidence in applying numeracy skills beyond classroom settings (Sadiq et al., 2025). Through academic–community collaboration, the contextual numeracy worksheets not only enriched the educational resources of the floating library but also contributed to the development of an edu-tourism literacy environment that supports meaningful, place-based, and culturally relevant learning experiences.

Strengthening Cultural Storytelling through Community–Academic–Media Collaboration

The cultural storytelling program implemented through the Floating Library demonstrated the effectiveness of community–academic–media collaboration in preserving and disseminating local cultural knowledge. Community members, including elders, cultural practitioners, and youth groups, actively participated in documenting oral traditions, folklore, historical narratives, and local wisdom that reflect the identity of the tourism village. Academic partners facilitated the collection, validation, and organization of these narratives into structured educational resources, ensuring both cultural authenticity and pedagogical value. The documented stories were subsequently transformed into literacy materials, such as storybooks, reading modules, and interpretive content integrated into edu-tourism activities. These resources enabled visitors to engage with local culture through meaningful learning experiences while simultaneously strengthening community awareness of cultural preservation. The findings indicate that cultural storytelling not only functions as a mechanism for safeguarding intangible heritage but also enhances literacy development and destination attractiveness. Such outcomes align with previous studies emphasizing that community participation, heritage documentation, and educational storytelling contribute significantly to sustainable tourism and cultural preservation (Liorančaitė-Šukienė & Jurėnienė, 2025; Singh & Dhakad, 2025; Conrad, 2013; Nam et al., 2025).

Furthermore, the development and dissemination of storytelling materials were significantly strengthened through digital and social media platforms. Academic institutions collaborated with media partners to convert local narratives into digital content that could be shared through websites, social media channels, and multimedia storytelling formats. This approach expanded the reach of cultural narratives beyond the physical tourism village and increased public engagement with local heritage. The use of digital storytelling enabled the presentation of cultural content in more interactive and visually appealing forms, making it particularly attractive to younger audiences. Social media promotion also enhanced destination branding by creating emotional connections between visitors and the cultural identity of the community. Through transmedia storytelling, cultural narratives could be experienced across multiple platforms, increasing both accessibility and audience participation. These findings suggest that digital transformation plays a crucial role in strengthening cultural promotion, supporting sustainable tourism development, and ensuring the continuity of local heritage in contemporary society. The results are consistent with previous research highlighting the effectiveness of digital storytelling, transmedia narratives, and technology-enhanced heritage promotion in fostering cultural engagement and tourism competitiveness (García et al., 2026; Zhou et al., 2025; Paganoni, 2019; Echavarria et al., 2019; Mytilinaiou et al., 2026).

Strengthening Community Management through Government and Business Support

The strengthening of community management within the Floating Library tourism village was achieved through improvements in library administration, service quality, and organizational governance supported by government agencies and business partners. Administrative enhancement included the development of standardized cataloguing systems, visitor records, lending procedures, and educational activity documentation, resulting in more efficient and accountable library operations. Service quality was also improved through the reorganization of workflows, clearer role distribution, and the adoption of user-oriented management practices

that increased accessibility and responsiveness to visitors' educational needs. Furthermore, participatory management approaches encouraged local residents to become actively involved in planning and evaluating literacy and tourism programs, fostering a stronger sense of ownership toward the library. Volunteer management was equally important in ensuring operational sustainability. Community volunteers, students, and youth groups were assigned specific responsibilities based on their skills and interests, while a clearer organizational structure improved coordination and decision-making processes. These findings demonstrate that effective administration, strategic volunteer engagement, and participatory governance contribute significantly to strengthening community-based educational facilities and tourism services (Balog, 2025; Piatak & Sowa, 2024; MacHado & Vergueiro, 2010; Siew, 2007).

Institutional and CSR-based resource support further enhanced the sustainability of the Floating Library by providing financial assistance, infrastructure, learning materials, and capacity-building opportunities. Government agencies contributed through policy support, community empowerment programs, and tourism development initiatives, while private-sector partners supported literacy activities through corporate social responsibility (CSR) programs (Suhud, Boonkaew et al., 2025; Suhud, Sihotang et al., 2026)). These collaborations enabled the acquisition of books, learning equipment, facility improvements, and training programs for volunteers and community members. The findings indicate that external support not only strengthened the operational capacity of the library but also expanded its role as an edu-tourism attraction that integrates literacy, culture, and community development (Suhud, Sihotang et al., 2026; Suhud, Wolor et al., 2025). Moreover, collaboration among government, business, and community stakeholders reflects the principles of pentahelix-based management, where multiple actors contribute complementary resources and expertise toward shared development goals. Such partnerships increase institutional resilience, improve stakeholder engagement, and create long-term benefits for local communities. The results support previous studies emphasizing that CSR initiatives, community-based tourism policies, and multi-stakeholder collaboration play a crucial role in enhancing organizational sustainability, community empowerment, and local development outcomes (Lee-Anant & Kungwansith, 2025; Thuan et al., 2025; ENEM et al., 2020; Vijay Kumar, 2013; Fordham et al., 2018).

Program Impact, Evaluation, and Sustainability

The implementation of the Floating Library program generated significant impacts on literacy development among children, local communities, and visitors by expanding access to educational resources and creating inclusive learning opportunities. The establishment of additional reading collections, literacy corners, and community-based learning activities increased the availability of books and educational materials that were previously limited in the tourism village. Children demonstrated greater interest in reading activities, while community members increasingly utilized the library as a space for informal learning, social interaction, and knowledge exchange. Visitors also benefited from access to locally relevant educational resources that enriched their tourism experiences. The integration of literacy programs within an edu-tourism setting strengthened the relationship between learning and recreation, making literacy activities more attractive and accessible to diverse user groups. Furthermore, regular reading campaigns, book-sharing initiatives, and community participation contributed to the creation of a sustainable literacy culture. These findings support previous studies indicating that improved access to literacy resources positively influences reading engagement, learning participation, and community empowerment, particularly in underserved areas (Waldron & Zwierzchowska-Dod, 2025; Yi et al., 2019; Marwan et al., 2024; Yılmaz Hiğde & Baştuğ, 2026; Stern, 2018).

In addition to improving literacy access, the program successfully enhanced numeracy and storytelling engagement through contextual learning experiences that connected educational content with local culture and tourism activities. Numeracy learning was integrated into real-life situations such as measuring distances, calculating tourism-related transactions, and interpreting environmental information, enabling participants to apply mathematical concepts in meaningful contexts. Simultaneously, storytelling activities encouraged children and visitors to explore local history, folklore, and cultural values through interactive discussions and creative expression. The combination of contextual numeracy and cultural storytelling increased learner engagement, critical thinking, and motivation by linking abstract concepts with everyday experiences. Digital

storytelling and collaborative learning activities further enriched the educational process by encouraging participation and creativity across different age groups. As a result, the Floating Library evolved from a conventional reading facility into a dynamic learning environment that supports lifelong learning and sustainable edu-tourism development. These findings are consistent with studies highlighting the effectiveness of storytelling, contextual learning, and digital engagement in strengthening literacy, numeracy, and educational outcomes (Koronaïou & Kostas, 2026; Cabrera et al., 2025; Sakthivel et al., 2025; Wang et al., 2026; Peixoto et al., 2023).

Evaluation of Pentahelix-Based Program Implementation

The evaluation of the Pentahelix-based implementation revealed that academic institutions played a significant role in strengthening the Floating Library through knowledge transfer, capacity building, and program evaluation. Universities contributed by designing contextual numeracy modules, developing cultural storytelling materials, conducting community training, and assisting in monitoring program outcomes. Academic involvement also facilitated evidence-based decision-making by providing research findings and recommendations for improving literacy and edu-tourism activities. At the community level, participation was reflected in the active engagement of local residents, youth groups, volunteers, and cultural practitioners in planning, implementing, and maintaining literacy programs. Community members contributed local knowledge, cultural narratives, and operational support, fostering a strong sense of ownership over the Floating Library. The findings suggest that meaningful participation enhanced program relevance, strengthened local empowerment, and increased the sustainability of literacy initiatives. Furthermore, the collaborative relationship between academics and community stakeholders created a co-learning environment where knowledge was exchanged and adapted to local needs. These results support previous studies emphasizing that academic engagement, community empowerment, and participatory approaches are essential components of successful Pentahelix-based development initiatives and sustainable community-based tourism programs (Suiter et al., 2016; Azwar et al., 2025; Widhiasthini et al., 2025).

The assessment of government, business, and media contributions further demonstrated the effectiveness of multi-stakeholder collaboration in supporting the sustainability of the Floating Library. Government institutions facilitated the program through policy support, coordination mechanisms, capacity-building activities, and access to tourism and educational development programs. Business actors contributed resources through financial assistance, infrastructure development, literacy materials, and corporate social responsibility initiatives that strengthened operational capacity. Meanwhile, media organizations and digital platforms played an important role in promoting literacy activities, disseminating cultural narratives, and increasing public awareness of the Floating Library as an edu-tourism destination. The synergy among these stakeholders enhanced program visibility, attracted wider community participation, and expanded opportunities for future collaboration. However, the evaluation also identified the need for stronger coordination mechanisms and long-term partnership commitments to maximize collective impact. The findings indicate that effective stakeholder integration within the Pentahelix framework creates a supportive ecosystem for innovation, community development, and sustainable tourism growth. These results are consistent with previous studies highlighting the importance of government facilitation, business engagement, media communication, and cross-sector collaboration in achieving sustainable development outcomes through the Pentahelix model (Pratiwi et al., 2025; Natalis et al., 2025; Sukri et al., 2023; Azwar et al., 2025).

Sustainability Strategy for the Floating Library

The sustainability of the Floating Library was strengthened through volunteer and community engagement programs that encouraged active participation in literacy, cultural, and tourism-related activities. Community members, youth organizations, and local volunteers contributed to reading programs, storytelling sessions, environmental education activities, and visitor assistance services. These initiatives fostered social cohesion and strengthened local ownership of the edu-tourism facility. The engagement process also enabled participants to develop leadership skills, expand social networks, and enhance their understanding of local cultural heritage. Partnerships with schools further increased the effectiveness of literacy programs by integrating educational visits, contextual learning activities, and cultural exploration into students' learning

experiences. Collaboration with government institutions supported capacity-building programs, educational campaigns, and tourism promotion efforts, creating a stronger institutional foundation for long-term program implementation. The findings indicate that sustained community participation and educational partnerships significantly improved the quality and reach of literacy services while promoting broader community development outcomes. These results are consistent with previous studies emphasizing the value of volunteer engagement, community immersion, educational partnerships, and stakeholder collaboration in creating sustainable and socially impactful tourism and educational initiatives (Lee, 2021; Hannibal & Robertson, 2023; Frigino, 2025; Anderson & Sanga, 2019; Jones & Clarke, 2024).

In addition to community engagement, digitalization initiatives played a crucial role in expanding the educational and tourism functions of the Floating Library. Digital platforms were utilized to promote literacy activities, document local cultural assets, disseminate educational content, and attract wider visitor audiences. The integration of social media, digital storytelling, and online promotional materials enhanced the visibility of the tourism village and enabled broader public access to educational resources. Digital tools also facilitated communication among stakeholders and supported the development of innovative learning experiences that combined literacy, culture, and tourism. Through these initiatives, the Floating Library evolved into a more dynamic edu-tourism destination capable of reaching both local and external audiences. The findings suggest that digital transformation not only strengthens tourism competitiveness but also enhances educational accessibility and stakeholder engagement. Furthermore, the integration of digital communication technologies supports the co-creation of learning experiences and promotes sustainable tourism development by connecting communities, visitors, and institutions through shared knowledge platforms. These findings support prior research highlighting the role of digitalization in tourism innovation, educational tourism growth, destination promotion, and community-based development (Zainol et al., 2023; Barashok et al., 2021; Sanju et al., 2025; Tjitunga et al., 2023; Inversini & Rega, 2020).

CONCLUSION AND RECOMMENDATIONS

General Conclusion

This community service program successfully strengthened edu-tourism literacy facilities at the Floating Library tourism village through the integration of contextual numeracy, cultural storytelling, and Pentahelix-based community management. The program enhanced literacy access by improving library facilities, expanding learning resources, and creating interactive educational activities for children, community members, and visitors. Contextual numeracy activities enabled participants to connect mathematical concepts with real-life situations encountered in the tourism village, while cultural storytelling initiatives preserved local heritage and transformed cultural narratives into meaningful educational resources. The integration of literacy, culture, and tourism created a more engaging learning environment that supported both educational development and destination attractiveness. Furthermore, the program demonstrated that community-based literacy initiatives can serve as effective instruments for empowering local communities while simultaneously enriching visitor experiences within an edu-tourism setting.

Contribution of the Pentahelix Model to Community Service Programs

The implementation of the Pentahelix model significantly contributed to the success and sustainability of the program by fostering collaboration among academia, government, business, community, and media stakeholders. Academic institutions provided knowledge, training, program design, and evaluation support. Government agencies facilitated policy alignment, institutional coordination, and access to development programs. Business partners contributed resources, infrastructure support, and community development initiatives, while media stakeholders enhanced program visibility through promotional and educational activities. Community members played a central role in program implementation, volunteer management, cultural preservation, and operational sustainability. This multi-stakeholder collaboration created a supportive ecosystem that enabled resource sharing, knowledge exchange, and collective problem-solving. The findings demonstrate that the Pentahelix approach can strengthen community service programs by increasing

stakeholder participation, improving program effectiveness, and ensuring long-term sustainability through shared responsibility and collaborative governance.

Recommendations for Future Program Development

Future program development should focus on strengthening digital literacy and technology integration to expand access to educational resources and increase the visibility of the Floating Library as an edu-tourism destination. Additional efforts should be directed toward developing more diverse contextual learning modules that integrate environmental education, local entrepreneurship, and cultural heritage preservation. Expanding partnerships with schools, universities, government institutions, and private-sector organizations will further enhance program sustainability and resource availability. Continuous volunteer recruitment and capacity-building initiatives are also recommended to maintain strong community engagement and organizational resilience. Furthermore, systematic monitoring and evaluation mechanisms should be established to measure long-term educational, social, cultural, and tourism-related impacts. By strengthening collaboration, innovation, and community participation, the Floating Library can continue to evolve as a sustainable model of community-based literacy development and edu-tourism management that can be replicated in other tourism villages and rural communities.

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