PROCEEDING OF RESEARCH AND CIVIL SOCIETY DESEMINATION

ISSN 3024-8426, Volume 3, No 1, Pages 228-235

DOI: https://10.37476/presed.v3i1.105

Digital Transformation and Hygiene Behavior in a Community Library: Evaluation at Rumah Baca Apung Rammang-Rammang

Faisal Rizal Zainal[1,*]; Risma Haris[2]; Nurkhalik Wahdanial[1]; Muh. Isnan Khaerah Haris[1]; Hera Nur Putri[1]

[1]Institut Teknologi dan Bisnis Nobel Indonesia

[2]Universitas Kurnia Jaya Persada

*Correspondence: faisal@nobel.ac.id

Abstract: Digital transformation plays a crucial role in enhancing community-based learning, especially in isolated coastal areas such as Rumah Baca Apung Rammang-Rammang in Maros Regency, South Sulawesi. This literacy hub faces various challenges, including limitations in catalog management, community participation, and awareness of clean and healthy living behaviors. This study aims to analyze the impact of integrating digital transformation and hygiene education on improving digital literacy, clean and healthy living behavior (PHBS), and technology acceptance among coastal communities. A quantitative approach with a pre-experimental one-group pretest–posttest design was employed, involving 63 participants, consisting of five community library facilitators and fifty-eight local residents. The intervention included the implementation of a QR code–based digital catalog system and a PHBS campaign via social media. Data were collected using a structured questionnaire and analyzed descriptively to measure changes before and after the intervention. The results indicated significant improvements across all three domains: digital literacy (112%), clean and healthy living behavior (102%), and technology acceptance (200%), particularly in perceived usefulness and behavioral intention. The study concludes that integrating digital technology with hygiene education effectively fosters behavioral and social transformation, strengthens community responsibility, and expands digital inclusion in coastal regions.

Keywords: Digital Literacy; Technology Acceptance Model (TAM); Hygiene Behavior; Community Library; Rural Innovation.

A. Introduction

Digital transformation has become a crucial catalyst for driving efficiency, transparency, and sustainability in public service management worldwide. Educational institutions and global literacy communities are increasingly shifting toward digital-based systems to enhance information access, expand learning opportunities, and promote inclusive literacy (Abdel-Aziz et al., 2022). Organizations such as UNESCO emphasize that digital literacy centers play a strategic role in supporting lifelong learning and sustainable development (Hanemann & Robinson, 2022).

In Indonesia, the digitalization of community education has gained attention through national initiatives such as the Gerakan Literasi Nasional (National Literacy Movement) and Transformasi Digital Desa (Village Digital Transformation), which highlight the importance of utilizing information technology in 3T regions (frontier, outermost, and underdeveloped areas) (Latief et al., 2024; Nadrljanski et al., 2022). However, the implementation of digitalization in community-based institutions—such as reading houses and literacy parks—continues to face challenges, including limited infrastructure, low digital literacy, and the lack of environmental integration in literacy activities (Haris, Sartika, et al., 2023; Latief et al., 2024).

Rumah Baca Apung Rammang-Rammang, located in Maros Regency, South Sulawesi, exemplifies these challenges. Situated in a unique karst and mangrove ecotourism area, this floating reading house holds great potential as an eco-based learning center. Nevertheless, its management remains manual, promotional activities are limited, and community environmental awareness has yet to be fully optimized.

Previous studies have mostly focused on improving community digital literacy (Budiarto et al., 2024; Detlor et al., 2022) or conducting environmental campaigns through social media (Ummar et al., 2023). However, none have integrated a QR code–based digital catalog system with environmental education campaigns in the context of a coastal community reading house.

Therefore, the novelty of this study lies in the development and implementation of a QR code–based digital catalog system integrated with environmental education campaigns via social media to strengthen the management and educational functions of Rumah Baca Apung Rammang-Rammang. This approach is expected to enhance digital literacy, environmental awareness, and sustainable community participation in coastal areas.

B. Theoretical Framework

Technology Acceptance Model (TAM)

The Technology Acceptance Model explains user adoption of digital systems through two key determinants: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Marangunić & Granić, 2015). These constructs influence Attitude Toward Use (ATU) and Behavioral Intention (BI) (Jannah et al., 2023). In this study, TAM was applied to evaluate the acceptance of the digital catalog system by community library facilitators.

Digital Literacy

UNESCO defines digital literacy as the ability to access, manage, evaluate, and create information using digital tools effectively. It extends beyond technical skill to include communication, problem-solving, and civic participation (Jannah et al., 2023). This framework guided the design of literacy training sessions conducted for local residents.

Clean and Healthy Living Behavior (PHBS) Model

The PHBS model emphasizes daily practices that maintain health and environmental cleanliness.

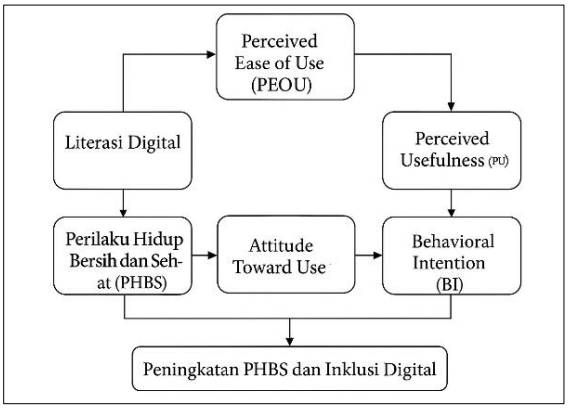

Figure 1. Integrative Theoretical Framework

It includes personal hygiene, waste management, and sanitation awareness. In this study, PHBS served as the behavioral dimension complementing digital literacy, ensuring that learning environments remained safe and hygienic (Haris, Satriawan, et al., 2023; Irma, 2022).

The enhancement of digital literacy plays a crucial role in strengthening the Perceived Ease of Use (PEOU) of technology implemented at Rumah Baca Apung Rammang-Rammang. As community members become more proficient in accessing and utilizing digital tools, they are more likely to adopt the QR code–based catalog system integrated into literacy activities (Zuo et al., 2025). Meanwhile, improvements in Clean and Healthy Living Behavior (PHBS) foster a positive Attitude Toward Use (ATU) toward technologies that promote environmental education and eco-literacy (Zuo et al., 2025). These two domains—digital literacy and PHBS—jointly contribute to shaping Perceived Usefulness (PU) and Behavioral Intention (BI) to sustain technology use over time (Obuobi et al., 2024). Ultimately, the synergy between digital literacy advancement and healthy living practices leads to Actual Use of digital technologies, resulting in social transformation, community capacity strengthening, and the expansion of digital inclusion in coastal areas.

C. Materials and Methods

This study employed a quantitative approach using a pre-experimental one-group pretest–posttest design to analyze the effect of integrating digital transformation and hygiene education on improving digital literacy, clean and healthy living behavior (PHBS), and technology acceptance among coastal communities. This design allowed the researchers to compare conditions before and after the intervention without a control group, focusing on behavioral and skill changes resulting from the training program and digital innovation implementation.

Location & Participants

The study was conducted at Rumah Baca Apung Rammang-Rammang in Maros Regency, South Sulawesi, an area situated within a karst and mangrove ecotourism zone. A total of 63 participants took part in the study, consisting of 5 community library facilitators and 58 local residents actively involved in literacy and environmental training activities.

Intervention Design

The intervention activities consisted of two main components:

1. Digital Transformation – Implementation of a QR code–based digital catalog system to simplify the management and access of book collections.
2. Hygiene Education (PHBS) – A clean and healthy living behavior campaign conducted through social media platforms (Instagram, Facebook, and WhatsApp Groups), focusing on environmental cleanliness and waste management.

The research instrument utilized a Likert-scale questionnaire (1–5) designed to measure three main domains: digital literacy (5 indicators), clean and healthy living behavior (5 indicators), and technology acceptance (5 indicators) based on the Technology Acceptance Model (TAM) framework. The questionnaire was administered in two stages—pretest (before the intervention) and posttest (after the intervention)—to identify changes that occurred among the participants.

The collected data were analyzed using a descriptive quantitative approach by calculating the percentage increase in each domain to assess the effectiveness of the QR code–based digital catalog system and the PHBS campaign implemented through social media. All participants were involved voluntarily by signing an informed consent form, and the implementation of activities was carried out while maintaining the sustainability of the mangrove ecosystem surrounding Rumah Baca Apung Rammang-Rammang, in accordance with the principles of sustainable research practices.

D. Result and Discussion

Research Results

The results of this study demonstrate significant changes across three main domains—digital literacy, clean and healthy living behavior (PHBS), and technology acceptance—following the implementation of the digital transformation and hygiene education interventions at Rumah Baca Apung Rammang-Rammang in Maros Regency. The pretest–posttest analysis revealed consistent improvements across all measured indicators, indicating the effectiveness of the program in strengthening the capacity of coastal communities toward digital innovation and healthy living practices.

Table 1. Comparison of Pretest and Posttest Scores Across the Three Main Domains

Measurement Domains	**Pretest (Mean)**	**Posttest (Mean)**	**(%) Improvement**
Digital Literacy	1.83	3.88	+ 112 %
Clean and Healthy Living Behavior (CHLB)	1.93	3.89	+ 102 %
Technology Acceptance (TAM)	2.00	4.00	+ 200 %
Overall Average	1.92	3.92	+ 104 %

The most significant improvement was found in technology acceptance (TAM), which increased by +200%, indicating that participants became more confident in operating the QR code–based digital catalog system independently, without external assistance.

The digital literacy component also more than doubled after the intervention, particularly in the ability to access digital information, scan QR codes, and manage reading content online. Meanwhile, clean and healthy living behavior (PHBS) showed a +102% increase, reflecting a tangible change in environmental hygiene practices such as waste separation and maintaining cleanliness around the mangrove ecosystem.

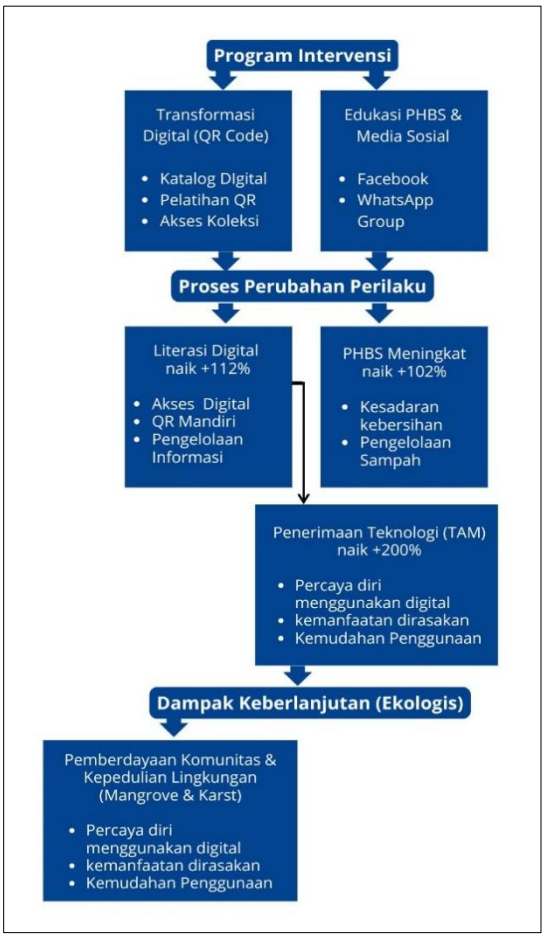

Figure 2. Integrative Theoretical Framework: TAM in Digital Literacy and PHBS at Rumah Baca Apung Rammang-Rammang

The following framework diagram illustrates the logical flow of relationships among variables in the process of digital transformation → behavioral change → technology acceptance → environmental sustainability within the Rammang-Rammang ecotourism area.

Input (Intervention)

a. Two main interventions: digital transformation using QR codes and PHBS (Clean and Healthy Living Behavior) education through social media.
b. Designed to empower the community by enhancing digital literacy and environmental hygiene awareness.

Process

a. An adaptive learning process occurred, where participants learned to utilize technology and apply it in daily activities.
b. Social interactions and community activities strengthened the internalization of PHBS values and digital literacy.

Output

Significant improvements were observed across three domains:

a. Digital Literacy (+112%)
b. Clean and Healthy Living Behavior (+102%)
c. Technology Acceptance (TAM) (+200%)

Outcome & Sustainability

a. The emergence of new environmental sustainability awareness (eco-pedagogy).
b. The formation of a digital culture oriented toward cleanliness and coastal ecosystem preservation.

Discussion

Strengthening Digital Literacy through QR Code Transformation

The implementation of a QR code–based digital catalog system has proven effective in enhancing digital literacy among coastal communities. This finding aligns with Haryono et al. (2022), who revealed that the use of QR codes in community education systems strengthens basic digital literacy, particularly in areas with limited technological infrastructure.

Participants became more independent in accessing and exploring digital collections, indicating a transformation from functional

literacy to adaptive literacy, where technology is utilized as a tool to increase efficiency and participation.

Improving Clean and Healthy Living Behavior (PHBS) through Digital Campaigns

Social media–based interventions significantly influenced changes in clean and healthy living behaviors (PHBS). The 102% increase demonstrates the effectiveness of visual messages and local narratives in encouraging community participation in environmental cleanliness.

This finding is consistent with Ali et al., (2021), who stated that hygiene education through social media enhances public awareness and social responsibility in maintaining environmental cleanliness.

This approach also reinforces contextual education based on local wisdom, as campaign narratives highlight values of togetherness, mutual cooperation, and responsibility toward the mangrove ecosystem(Gunawan et al., 2025).

Technology Acceptance and Enhanced Digital Self-Efficacy

An increase of +200% in technology acceptance (TAM) indicates that participants have undergone a process of digital self-efficacy—developing confidence in using technology independently without external dependence. This reflects the success of the participatory training approach applied during the program.

The result aligns with the Technology Acceptance Model (Davis, 1989), which emphasizes that perceived usefulness and perceived ease of use are the main factors driving the adoption of new technologies (Luo et al., 2024).

Synergy between Digitalization and Ecopedagogy in the Rammang-Rammang Ecotourism Area

The success of this intervention also reflects a synergy between digital transformation and ecopedagogy (environment-based education). Located in the karst and mangrove areas of Rammang-Rammang, participants not only improved their digital skills but also developed ecological awareness toward coastal environmental conservation.
The integration of local values such as siri' na pacce (dignity and social empathy) within educational messages became a key factor in internalizing clean and sustainable behaviors.

E. Conclusion

This study demonstrates that the integration of QR code–based digital transformation with Clean and Healthy Living Behavior (PHBS) education has produced a significant impact on improving digital literacy, technology acceptance, and environmental awareness among the coastal community at Rumah Baca Apung Rammang-Rammang, Maros Regency. The pretest–posttest results confirmed consistent improvement across all research domains, with the highest achievement recorded in technology acceptance (+200%), indicating a notable increase in participants' digital self-confidence.

The implementation of a QR code–based digital catalog system not only simplified the management of reading collections but also strengthened community participation in technology-driven literacy activities. Meanwhile, the PHBS campaign conducted through social media effectively fostered positive behaviors toward cleanliness and environmental conservation within the mangrove ecosystem.

The synergy between digitalization and ecopedagogy has resulted in a sustainable social transformation: the community has become more adaptive to technology, more environmentally conscious, and more actively engaged in community literacy initiatives. These findings affirm that a technology- and environment-based learning model can serve as an effective strategy to expand digital inclusion and strengthen the capacity of coastal communities toward sustainable development.

Acknowledgment

The researchers would like to express their deepest gratitude to the Directorate of Research, Technology, and Community Service (DPPM) – Ministry of Education, Culture, Research, and Technology (Kemdikbudristek) for the financial support provided for the implementation of this project.

Special appreciation is also extended to Institut Teknologi dan Bisnis Nobel Indonesia for the academic and institutional support that made this research possible, as well as to the Rumah Baca Apung Rammang-Rammang community, whose collaboration, enthusiasm, and active participation greatly contributed to the success of the program.

This collective effort reflects the strong synergy between higher education, government, and community institutions in promoting digital transformation and environmental sustainability.

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