



Innovation Model of Digital Library Management to Enhance Literacy Culture in Senior High Schools

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ABSTRACT

This study aims to analyze how digital library innovations cultivate a reading culture in senior high schools. The specific objectives are to examine the planning, implementation, evaluation, and management models applied in school-based digital library programs. Using a qualitative multi-case study approach, data were collected from principals, librarians, subject teachers, and students of SMA Negeri 3 Unggul Sigli and SMA Sukma Bangsa Pidie through observation, interviews, and document analysis. The findings reveal that the planning stage aligns literacy programs with the school's vision, mission, and budget allocations to ensure targeted outcomes. During implementation, librarians provide optimal services such as online catalogues, e-books, and reading challenges—that encourage active student participation and increase reading frequency. Continuous evaluation is conducted through audits, user surveys, and feedback mechanisms, allowing weaknesses to be corrected promptly while best practices are disseminated. Finally, the management model follows a collaborative cycle that includes needs assessment, resource digitization, staff capacity building, and periodic updates to maintain the relevance of collections. By integrating these elements, the study concludes that systematic innovation in digital library management effectively strengthens a sustainable literacy culture among senior high school students.

Keywords: literacy culture, innovation models, digital library management

INTRODUCTION

The exponential development of information technology requires the younger generation to not only be able to access, but also understand, analyze, and use information critically [1]. In high school, this challenge becomes more complex because students are in the cognitive transition phase from concrete to abstract thinking and are vulnerable to hoaxes and disinformation [2]. Therefore, literacy culture which refers to life habits that are learned, inherited, and continuously established through social interaction [3] is the main foundation to shape the character competitiveness, and quality of Indonesian human resources in the future.

The paradigm shift in learning from "chalk-and-talk" to a technology-based model has fundamentally changed the education ecosystem [4]. Technology no longer acts as an aid, but as the primary medium that enables independent, responsive, and collaborative learning [5], [6]. In the high school context, this means that classrooms are now wide open through digital devices that connect students to global learning resources, while also requiring educators to develop digital literacy competencies so they can act as facilitators [7].

The School Literacy Movement (GLS) launched by the Ministry of Education and Culture is a strategic instrument for instilling a culture of literacy at the high school level [8]. Routine activities such as 15 Minutes of Reading, book discussions, and the production of written works foster 4C (Critical thinking, Creativity, Communication, Collaboration) skills that are essential for job readiness [9]. Field studies show that schools that run GLS consistently improve the value of discipline and empathy in students [10], [11].

Digital library Santoso's definition is "a library whose collection is stored in digital format and accessed through the network" [12] has become the right solution to harmonize the demands of literacy with the physical limitations of print collections. Susinta & Senjaya's research proves that digitalization expands the reach of information, reduces reproduction costs, and improves administrative efficiency [13]. In high school, digital library management requires systematic planning as formulated by Bafadal: determining needs, actors, methods, and schedules of activities, so that literacy goals can be achieved effectively and efficiently [14].

Neatly indexed digital collections on OPAC catalogs and Android-based apps allow students to access thousands of learning resources anytime and

anywhere [15]. Abdalkhair & Elemam's findings show that responsive user experience on digital platforms is positively correlated with reading motivation [16]. Furthermore, digital libraries enriched with multimedia content improve learning effectiveness through visual-auditory approaches and interactive contexts [17]. Thus, digital libraries are a catalyst for building sustainable digital literacy habits.

The results of initial observations at SMA Negeri 3 Unggul Sigli and SMA Sukma Bangsa Pidie illustrate that the heads of the libraries consistently innovate in management by adjusting the classification of digital collections to the curriculum, providing barcode-based lending services through student cards to accelerate the borrowing process, promoting programs via social media, school websites, and literacy canteens, as well as collaborating with local communities to establish writing groups and expression corners. The achievements of both schools at district and national levels reinforce the assumption that innovative digital library management models contribute directly to improving literacy culture.

Based on the urgency of digital literacy, the shift in learning paradigms, and the presence of innovative practices in schools, this study aims to design and examine a Digital Library Management Innovation Model that strengthens the literacy culture in senior high schools. The research focuses on how such a model can be formulated to fit the specific context of high schools in Pidie, how it contributes to expanding information access, enhancing reading interest, and improving student learning effectiveness, as well as what supporting and inhibiting factors emerge during its implementation. The findings are expected to provide valuable insights for education offices, school principals, and librarians in formulating sustainable digital literacy policies.

The rapid growth of digital technology has significantly transformed the management of school libraries, shifting from traditional collections to digital-based services that are more accessible and interactive. Previous studies on digital library management have primarily focused on technical aspects such as system design, digitization processes, and service efficiency. However, limited attention has been given to how digital library innovations can systematically cultivate a sustainable literacy culture within the school environment, especially in the context of senior high schools in Indonesia. This research offers novelty by integrating four dimensions—planning, implementation, evaluation, and management models—into a comprehensive framework that directly links digital library innovations with literacy culture development. By adopting a multi-case study design, the study not only examines digital library practices in different school settings but also highlights a collaborative model that can be replicated in similar educational contexts.

Accordingly, the objective of this study is to analyze how digital library management innovations enhance literacy culture in senior high schools by

exploring their planning, implementation, evaluation, and management models.

RESEARCH METHODS

This research employed a qualitative multi-case study design to explore how digital library management innovations contribute to the development of literacy culture in senior high schools [18], [19], [20]. The cases were selected purposively, namely SMA Negeri 3 Unggul Sigli and SMA Sukma Bangsa Pidie, as both institutions have demonstrated notable achievements in literacy-based programs at regional and national levels. Data were obtained from multiple sources, including principals, librarians, subject teachers, and students, in order to capture diverse perspectives and ensure the richness of information [21], [22], [23]. The techniques of data collection consisted of in-depth interviews, non-participant observations of library activities, and analysis of relevant documents such as library records, literacy program reports, and school policy documents [24], [25], [26].

The process of data analysis followed the interactive model proposed by Miles and Huberman, which emphasizes the cyclical and iterative nature of qualitative research [27], [28]. The analysis began with data reduction, where transcripts, observation notes, and documents were carefully reviewed and categorized according to four central themes: planning, implementation, evaluation, and management models. The reduced data were then displayed in narrative descriptions and comparative matrices to highlight emerging patterns and interconnections across the two cases. Finally, conclusions were drawn and verified through member checking with key participants and triangulation of different data sources to ensure credibility and trustworthiness [29], [30]. This systematic approach allowed the study not only to describe the practices of digital library management but also to construct an analytical model that demonstrates its role in strengthening a sustainable literacy culture.

RESULT AND DISCUSSION

1. Digital Library Planning Innovation

The study found that the planning of digital library programs in Pidie Regency's senior high schools was systematically designed to align with the vision and mission of each institution. Planning was completed prior to the start of the academic year, ensuring that literacy initiatives were not incidental but embedded in the broader school agenda. This proactive strategy explains why implementation ran smoothly: by anticipating student needs through surveys and interviews, the planning team was able to match resources with demand and prevent redundancy. Similar to Yunianika et al. [31], [32], who argue that school libraries must be the starting point for digital-literacy interventions, this study demonstrates that effective planning transforms the library from a passive repository into a strategic driver of literacy culture. However, the reliance on

formal procedures such as SOPs and budget approvals also created a bureaucratic layer that, while ensuring accountability, occasionally slowed down the responsiveness to emerging needs [33].

2. Innovation in Implementation

Implementation revealed that literacy culture was strengthened when responsibilities were clearly distributed among principals, librarians, teachers, and staff. This division of labor enabled the smooth integration of digital services such as e-book access, barcode-based borrowing, and online reading challenges. The cause-effect relationship here is straightforward: clarity of roles reduced overlaps and confusion, allowing each actor to focus on specific tasks. Students benefitted directly from these arrangements, reporting faster access to resources and greater motivation to participate in reading activities. These findings resonate with studies by A (Year) and B (Year), who emphasized that organizational clarity enhances service quality and student engagement. At the same time, this research extends the literature by showing how cross-functional literacy teams—including student representatives—add a layer of peer-driven motivation rarely noted in earlier studies. The strength of this approach lies in its collaborative ethos, though a noted weakness was the uneven digital skills among staff, which occasionally hampered seamless service delivery [34], [35], [36], [37], [38].

3. Innovation in Supervision and Evaluation

Supervision and evaluation emerged as decisive factors in sustaining literacy culture. The use of quantifiable indicators such as e-resource download frequency and catalogue accuracy, combined with qualitative tools like surveys and focus groups, allowed schools to detect both technical and behavioral trends. The results confirmed that leadership involvement, particularly the principal's hands-on monitoring, created a culture of accountability without fear of punishment, encouraging staff to propose creative solutions. This finding aligns with Orhani, who stressed that effective supervision transforms evaluation into a collaborative learning process [39], [40], [41], [42]. However, the Pidie model contributes further by embedding leadership authority directly into feedback loops, thereby translating monitoring data into concrete corrective actions. This ensures that evaluation functions not as an endpoint but as a springboard for continuous innovation.

4. Updating the Model

The decision to update the digital library model through initiatives such as AI-driven recommendation engines and the creation of Digital Corners demonstrates the schools' responsiveness to evolving technological landscapes. The findings

show that personalization of reading choices using AI increased student agency and reading frequency because students felt the content was tailored to their needs. This corroborates, who warned that AI must support, not replace, learner autonomy; in Pidie, AI was positioned as a scaffold rather than a substitute [43], [44]. The Digital Corner, meanwhile, created a hybrid collaborative space that reduced instances of negative online behavior and fostered constructive peer interaction, echoing STEAM-based research advocating learning environments that combine cognitive and affective development [45], [46], [47]. The strength of this updated model lies in its adaptability, though challenges such as sustaining internet infrastructure and continuous staff training remain potential barriers.

5. Overall Contribution and Implications

Taken together, the Pidie experience illustrates that literacy culture can be effectively cultivated when digital library management is approached as an iterative cycle of planning, implementation, supervision, and updating. The novelty of this research lies in framing digital libraries not merely as technological systems but as collaborative ecosystems shaped by leadership, community participation, and continuous evaluation. Compared with earlier studies that focused primarily on access or technical efficiency [33], [40], this study integrates organizational and cultural dimensions, showing that innovation must be both technological and managerial. The practical implication is a replicable governance model that education offices and schools can adopt with minimal additional cost, while the theoretical implication is an enriched understanding of digital libraries as catalysts for holistic literacy development. The strengths of this study lie in its multi-case design and triangulation of data, while its limitations include the focus on only two schools, suggesting the need for future research in more diverse contexts.

CONCLUSION

This study has demonstrated that the innovation of digital library management in senior high schools of Pidie Regency—through systematic planning, structured implementation, continuous supervision, and iterative updates—contributes significantly to strengthening students' literacy culture. The findings indicate that success is largely driven by the integration of organizational planning, the active involvement of principals and librarians, and the adoption of adaptive technologies such as AI-based recommendation systems. These factors collectively enhance information access, stimulate reading interest, and improve the effectiveness of the learning process.

The strengths of this research lie in its holistic approach: the model is not limited to technical innovations but is grounded in participatory

management, sustainable supervision, and cultural adaptation within the school context. Nonetheless, limitations exist in terms of the study's scope, as it is confined to high schools in Pidie Regency, and thus requires further testing in different regions or under-resourced schools to confirm scalability and generalizability.

When compared with previous research, the results are in alignment with both national and international findings that emphasize the role of digital libraries in expanding access and fostering literacy. However, this study extends prior work by operationalizing innovation through leadership-driven supervision cycles and by embedding affective dimensions—such as discipline and empathy—into literacy evaluation. In this respect, the Pidie model contributes a distinctive governance framework that integrates digital literacy, character education, and institutional sustainability.

The implications of this research are threefold. First, it provides policymakers and education offices with a practical management template for developing school-based digital literacy ecosystems. Second, it equips school principals and librarians with a replicable model for planning, implementing, and updating digital-library services in alignment with evolving student needs. Third, it contributes to the academic discourse by offering empirical evidence that digital libraries can serve as dynamic catalysts for both cognitive and socio-emotional growth. Taken together, these contributions affirm that innovative digital library management is not merely a technical upgrade but a strategic pathway to cultivating a sustainable literacy culture in Indonesia's schools.

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