

Digital service development strategy in Ganesa Library, SMA Negeri 1 Cangkringan, Yogyakarta

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Abstract

In the current digital era, libraries must develop digital-based services to remain relevant and meet users' increasing demands for fast and easily accessible information. This study investigates the strategic development of digital services at the Ganesa Library, the challenges encountered, and the measures taken to address them. Employing a qualitative research design with a case study approach, data were collected through interviews, observations, and document analysis involving the principal, head of the library, and librarians as key informants. Data validity was ensured through the triangulation of techniques and sources, while data analysis followed the interactive model of Miles and Huberman. The findings indicated that the digital service development strategy comprised three main stages: planning, implementation, and evaluation. The planning phase included needs assessment, goal formulation, feasibility analysis, budgeting, and establishing partnerships. During implementation, the library identifies specific digital services to be developed and delegates operational responsibilities. Evaluation was conducted through the identification of challenges and annual performance reviews. Major challenges faced included limited financial resources, shortage of qualified personnel, inadequate IT skills among librarians, and low utilization of existing digital services. To address these issues, the library organized workshops and seminars that promoted teamwork, encouraged effective communication, and adopted flexible budgeting strategies. These strategic efforts aim to enhance the quality and effectiveness of the Ganesa Library's digital services, ensuring their continued relevance and responsiveness to users' needs in the digital age.

Keywords: Digital services; Development strategies; Barriers to digital services; School library

Strategi pengembangan layanan digital di Perpustakaan Ganesa SMA Negeri 1 Cangkringan, Yogyakarta

Abstrak

Pada era digital, perpustakaan menghadapi tantangan untuk tetap relevan dengan mengembangkan layanan berbasis digital yang mampu memenuhi kebutuhan pengguna terhadap akses informasi yang cepat, mudah, dan fleksibel. Penelitian ini bertujuan mengkaji strategi pengembangan layanan digital di Perpustakaan Ganesa, dengan menganalisis hambatan hambatan yang dihadapi, serta upaya strategis untuk mengatasi hambatan tersebut. Penelitian menggunakan metode kualitatif dengan pendekatan studi kasus. Informan terdiri dari kepala sekolah, kepala perpustakaan, dan pustakawan. Teknik pengumpulan data dilakukan melalui wawancara mendalam, observasi lapangan, dan studi dokumentasi. Validitas data diuji melalui triangulasi teknik dan sumber, sedangkan analisis data menggunakan model interaktif Miles dan Huberman. Hasil penelitian menemukan bahwa strategi pengembangan layanan digital di Perpustakaan Ganesa mencakup tiga tahap utama: perencanaan, pelaksanaan, dan evaluasi. Perencanaan meliputi analisis kebutuhan, penetapan tujuan, studi kelayakan, penyusunan anggaran, dan kerja sama eksternal. Pelaksanaan difokuskan pada pemilihan jenis layanan digital dan pembagian tugas operasional. Evaluasi dilakukan melalui peninjauan tahunan dan identifikasi masalah. Hambatan utama yang dihadapi meliputi keterbatasan anggaran, kurangnya tenaga dan keterampilan TI pustakawan, serta rendahnya pemanfaatan layanan digital. Untuk mengatasinya, perpustakaan menerapkan pelatihan, kerja tim, komunikasi efektif, dan manajemen anggaran yang fleksibel.

Kata Kunci: Layanan digital; Strategi pengembangan; Hambatan layanan digital; Perpustakaan sekolah

INTRODUCTION

Schools provide various learning support facilities to optimize the teaching and learning process. One of these vital facilities is the school library, in physical and digital form, which can be utilized by students for investigation, research, imagination and creativity (Oberg & Schultz-Jones, 2015). The library's utilization is very helpful for the development of knowledge as well as the student's personal, social and cultural development. In everyday life at school, the library is an integral part of students' activities in seeking and expanding their horizons. In order for this role to run effectively, the existence of adequate learning facilities is an absolute thing. This is in line with Government Regulation of the Republic of Indonesia Number 32 of 2013 concerning National Education Standards Article 1 Paragraph 9, which states that:

"Facilities and Infrastructure Standards are criteria regarding learning rooms, sports venues, places of worship, libraries, laboratories, workshops, playgrounds, creative and recreational places and other learning resources, which are needed to support the learning process, including the use of information and communication technology" (Peraturan Pemerintah, 2013).

Based on these regulations, the school library organization is a must and essential in the learning process because the library is one of the standard criteria for educational facilities and infrastructure. The significance of the school library's existence is also regulated in Law No. 43 of 2007 concerning Libraries Article 23 Paragraph 1, which states that every school/madrasah is required to organize a

library in accordance with national education and library standards (Peraturan Perundang-Undangan, 2007). Thus, we can comprehend that the existence of libraries, especially school libraries, is a facility whose existence is essential in implementing the teaching and learning process.

School libraries provide various types of library materials designed to meet the information needs of students, especially in supporting the learning process and the formation of literate people (Nasrullah et al., 2023). In addition, the library is also a physical and digital learning space that can be utilized by students for investigation, research, imagination, and creativity, thus playing a crucial role in the development of knowledge as well as fostering personal, social, and cultural aspects (Oberg & Schultz-Jones, 2015). Moreover, the library ensures equal access to books, information and information technology for all school members. Based on its various functions and roles, the school library has a very strategic position in supporting the achievement of educational goals.

The library plays a role in providing the information needed by teachers to support the success of the learning process (Mahwasane, 2019). In addition, the collection provided by the library should be relevant and appropriate to the education level of the students, as the right information greatly affects their learning achievement. In fact, research by Clark & Teravainen-Goff (2018) showed that children's mental well-being can be improved through effective access to school libraries, with children with above-average reading abilities being three times more likely to have better mental well-being than their peers with below-average reading abilities (40.3% vs. 13.1%). Based on this,

libraries play a crucial role not only in supporting learning achievement but also in supporting students' mental well-being and holistic development.

In supporting the library's primary mission as an information provider, excellent service is essential and is performed by library staff who interact directly with users. Bustari (2019) stated that library services are one of the keys to the successful implementation of school libraries. These services include various forms, such as borrowing and returning books and references, developing reading interests, and providing lockers. In line with that, Oberg and Schultz-Jones (2015) added that information and communication technology (ICT) can extend the reach of library services to school and home environments. A strong ICT infrastructure enables access to physical and digital collections and community resources and supports research and presentation activities. The Australian School Library Association (2013) also emphasized that the main purpose of school library services is to provide opportunities for students and school residents to learn, enjoy reading and create new knowledge. Thus, library services basically aim to facilitate students and teachers in accessing information that supports the academic process at school.

In the current era of globalization, information can be accessed quickly and smoothly thanks to the rapid development of technology. Changes in the era have brought libraries into the digital era, thus presenting new challenges and opportunities (Siregar & Syam, 2024). Islam and Habiba (2015) stated that social media such as Facebook, Twitter, and YouTube strengthen the relationship between librarians and users. Syn et al. (2023) added

that Twitter is very effective for real-time communication and promotion of public library services, especially during a pandemic, where social media has become the main channel for information dissemination and rapid response (Mehta & Wang, 2020). Sable (2020) revealed that library users are now accustomed to digital technologies such as computers, the internet, and the web, thus demanding access to up-to-date information and supportive ICT facilities. The use of ICT has been proven to increase library user satisfaction. However, the adoption of digital technology must be accompanied by a mature strategy considering its advantages and disadvantages so that digitalization can be realized comprehensively (Chisita et al., 2022). Social media is also an important platform for communicating the progress of library services in emergencies.

Today's libraries must adopt internet-based services to stay relevant and not be abandoned by their users. The more libraries provide information online, the greater the utilization by users (Jan, 2018). Library websites are an effective medium for promoting and introducing available services and facilities (Wulandari et al., 2021). Maryono and Pramono (2020) added that technological developments in the Industry 4.0 era connect the Internet with various devices (Internet of Things), services, and smart industrial infrastructure (smart factories). This process relies heavily on network technology and artificial intelligence (AI), which also drives the presence of various digital services and self-services.

The development of online reference searches is increasingly considered an efficient solution that can compete with physical library collections (Li et al., 2018).

The digital revolution has led to the digitization of many library functions, significantly changing the way librarians work. Today, librarians leverage technology to support tasks such as acquisition, cataloguing, preservation, information dissemination and reference services. However, physical libraries remain relevant and function alongside digital libraries (Dongare, 2022). Thus, the role of librarians remains crucial in managing conventional and digital libraries, while maintaining a balance of responsibilities in both environments. Digital libraries are expected to increase service effectiveness by facilitating access to complete and accurate information through various media managed by the library (Riyanto et al., 2023).

To meet the needs of today's students, school libraries must develop a high-tech environment to deliver the required learning experiences. In accordance with Law No. 43 Year 2007 concerning Libraries Article 14 paragraph 3, 'Every library develops library services in accordance with advances in information and communication technology'. This is in line with Pagore (2024), who explains that the integration of ICT resources is essential in academic libraries to facilitate resource sharing, improve services, save time, open up service marketing opportunities, and ensure fast and up-to-date access to information for stakeholders. The changing behaviour of users, who now more often access online information sources online through mobile devices, has led to a decrease in students' physical visits to the library. Although the need for physical library spaces for quiet study and collaboration remains, the use of digital resources such as databases and e-journals is increasing (Pandey & Mishra, 2024).

Stejskal and Hajek (2015) state that in the current era, the need for digital information is increasing among the public. Libraries can respond by expanding digital services that provide remote access, which has proven to be more effective than other services in public libraries. However, libraries face the challenge of increasing demand for services amidst limited resources and diminishing support. Technology plays a vital role in expanding services while reducing resource requirements through automation, making technology the saviour hope of libraries (Bélanger, 2025). Libraries are now entering a new phase, with collections shifting from print to digital. Digitization and streaming services make materials more accessible, increasing the frequency of use amidst the proliferation of digital research. Therefore, the ease of use of library catalogues and websites is crucial (Walsh & Rana, 2020).

Connaway (2015) explains that amidst rapid changes in the global information environment, libraries face many challenges. The digital landscape demands libraries to be more user-centric in all their systems and services while returning to their core philosophy amidst the abundance of unorganized information sources in cyberspace. Direct access to complete content on the internet increases user expectations and experiences in information delivery. Therefore, libraries must adapt to new technologies to provide innovative information services (Acharya & Tippanna, 2023). If libraries do not change to meet the demands of increasingly smartphone-friendly users, the biggest risk is abandonment. To summarise, modern library services are essential for three main reasons: the rapid and infinite changes in information demand that libraries adapt to stay relevant; the increased user demand

and expectations for quick access and accurate information; and technological advances that facilitate access to information anytime and anywhere. These factors emphasize the need for library evolution through digital services to remain effective in the digital age.

Although the importance of digital transformation in libraries has been widely emphasized, national data shows that the implementation of digital services in school libraries still faces various challenges. According to a report from the National Library of Indonesia, the total number of libraries in the country exceeds 164,000 units, yet only around 5.7% have been accredited (Perpusnas, 2023). Furthermore, the major obstacle in optimizing digital services is limited human resources; only around 21% of librarians have been certified, and among them, only 81% are deemed competent. School libraries are also reported to lack more than 500,000 professional librarians (Perpusnas, 2023).

SMA Negeri 1 Cangkringan (SMANCA) continues to develop its library services intensively. This is evidenced by the achievement of 'A' accreditation from the National Library Accreditation Agency and the victory of the Ganesa Library as the first winner of the DIY school library competition in 2020. These achievements cannot be separated from the efforts to develop library services, facilities, and resources. The Head of Ganesa Library, Sunarsih, S.Pd, stated that her party would continue to improve services, motivate the school community's interest in reading, add supporting facilities, and expand cooperation with the government and private agencies related to libraries (Humas SMANCA, 2020). Meanwhile, Principal Anies Rachmania, SS, M.Pd hopes that the modern and minimalist Ganesa library can

motivate students, improve reading literacy, and support their achievements and bright future (Humas SMANCA, 2020). Meanwhile, Principal Anies Rachmania, SS, M.Pd hopes that the modern and minimalist Ganesa library can motivate students, improve reading literacy, and support their achievements and bright future (Humas SMANCA, 2020).

Based on the results of preliminary observations, the development of digital services at the Ganesa Library is currently still in the refinement stage. Various digital services that have been developed include internet services, computers, tablets, audiovisuals, e-books, android-based library applications, circulation services with loan extensions via Instagram direct messages, and web libraries with online OPAC. This development is in line with the 21st-century globalization era marked by the rapid advancement of information technology that allows unlimited service coverage for users. In the future, the development of digital services will continue to meet the challenges of the times. Therefore, libraries and their resources must be responsive to change and design strategies to develop digital services sustainably.

The development of digital library services certainly did not always run smoothly. The library encountered several obstacles during the process. One of the main inhibiting factors was budget constraints; the 5% allocation of funds for all library operations has not been able to meet the high technology development needs. Therefore, the library needs to develop an efficient financing strategy so that the development of digital services can continue. In addition, there are still users who are not able to utilize digital services optimally, even though the facilities are

available. Therefore, the library continues to design strategies to increase the utilization of digital services by users. Limited human resources, especially in terms of librarian technological skills, are also a challenge in the development and service of digital libraries.

Based on the description above, which is related to the development of digital services at the Ganesa Library of SMA Negeri 1 Cangkringan, the researcher wants to examine further the library's strategy in implementing the development of these services. Through this study, the researcher also wants to find how the library seeks solutions to the obstacles or challenges it faces.

Although various studies have discussed the importance of integrating information technology in the development of school library digital services, previous researches has focused more on the aspect of technology infrastructure to improve user satisfaction (Sable, 2020; Li et al., 2018), Islam & Habiba, 2015; Syn et al., 2023), as well as the influence of digital infrastructure on the effectiveness of services (Dongare, 2022). However, most of the studies focused on college or public libraries, and have not explored in depth related to digital service development strategies in school libraries.

Therefore, this study fills this gap by presenting an in-depth case study at the Ganesa Library of SMA N 1 Cangkringan. This research not only describes the strategic stages (planning, implementation, evaluation), but also shows how adaptive and collaborative strategies are applied contextually in schools with limited resources.

This study is important because it makes a practical contribution to other school libraries facing similar challenges,

while enriching the literature on secondary school library digital service development strategies. Thus, the expected impact of this research is as a guide for librarians in designing digital services with limited resources, implementation that can be replicated in schools with similar challenges, and then as a consideration for policymakers in designing training programs and public-private partnerships in supporting the transformation of school library services. In line with this, this research is designed to answer these questions: (1) What is the strategy for developing digital services in the Ganesa Library of SMA Negeri 1 Cangkringan? (2) What are the obstacles or challenges faced in developing digital services? (3) What efforts or solutions are libraries making to overcome these barriers?

RESEARCH METHODS

This study employed a qualitative approach with a case study method. Qualitative research is a naturalistic method in which the researcher is considered a key instrument, aiming to produce an understanding that emphasizes meaning over generalization (Sugiyono, 2015). Meanwhile, the case study method refers to a series of scientific activities conducted intensively, in detail, and in-depth regarding a particular event or activity involving individuals, groups, institutions, or organizations to gain a comprehensive understanding. Usually, the events chosen—referred to as cases—represent real-life occurrences that are ongoing rather than past events (Rahardjo, 2017).

This research was conducted in May 2024 at SMA Negeri 1 Cangkringan, Sleman, DI Yogyakarta, employing a purposive sampling technique. The informants consisted of the school

principal, the library head, and the librarian, who were selected based on their direct involvement in the management and development of digital library services. These individuals were selected for meeting the criteria of possessing authority, experience, and knowledge related to digital library services, as well as being actively engaged in efforts to improve library services at the school.

Data collection was carried out through semi-structured interviews, in which the researcher prepared a list of questions (*interview guide*) yet allowed informants the flexibility to elaborate on their answers freely. This approach also enabled the researcher to explore further by posing follow-up questions based on the responses given. For example, when exploring whether the library had conducted a SWOT analysis in developing digital services, it revealed that the library had not utilized SWOT; instead, they relied on input from the school community as a basis for policy-making. Each interview session lasted an average of 40 minutes and took place on school premises. The researcher also carried out observations, focusing on the digital library services and how users interacted with them. Specifically, the researcher observed how librarians provided these services to users, noting that with only two staff members, the library often struggled to manage both digital and offline services simultaneously. In addition, the researcher conducted document analysis, which included reviewing school and library budget documents and documents concerning external partnerships established for digital service provision.

Data collection involved the integration of interview results, observations, and documentation. The data analysis followed an interactive model (Miles, M. B., & Huberman, A. M., 2014), which consisted of three concurrent flows

of activity: data reduction, data display, and conclusion drawing/verification. In the data reduction phase, raw information from interviews and observations was condensed through coding and summarization to focus on relevant aspects. This was followed by data display, where the information was organized into matrices and thematic categories for clearer interpretation. Finally, the conclusion-drawing phase involved interpreting patterns and relationships in the data to formulate meaningful insights.

The instruments used were designed to gather comprehensive information from informants regarding the strategies for developing Ganesa Library's digital services, the obstacles encountered, and the solutions implemented. Data were also obtained by observing the digital service infrastructure and the procedures undertaken during their development. Once collected, all data—comprising transcripts, interview notes, and field observations—were systematically organized and prepared for analysis. The categorization process grouped the data into major themes such as planning, implementation, and evaluation. These themes were then described narratively to illustrate the development process in a structured manner. The final stage involved drawing conclusions based on these themes to identify key findings and implications of the study.

To ensure data validity, triangulation of sources and methods was employed. The researcher processed the interview results by grouping responses based on similar questions and then concluded. Source triangulation was conducted by comparing interview data with field observation results and document studies that were carried out previously. This study was conducted with the informed consent of all participants, who had been given clear explanations of the purpose of the study,

Table 1
Informants List

No	Initial Name	Position
1	M. WL	Principal
2	S	Head of Library
3	AN	Librarian

Source: Result of research, 2024

the expectations of their participation, and how the researcher would use the data. Informants were assured that all information provided would be used solely for research purposes and that their identities and personal data would be kept confidential. Table 1 shows the list of informants interviewed in this study.

RESULTS AND DISCUSSION

The data categorization process was carried out using thematic analysis techniques based on the interactive model of Miles & Huberman (2014). It consists of three main stages: data reduction, data display, and verifying conclusions. After data were collected through interviews, observations, and documentation, the initial step taken was to reduce the data by re-reading the interview transcripts and field notes, followed by assigning codes to relevant data segments. These initial codes

were then grouped into thematic categories based on similarities in meaning and focus. Through this process, three recurring and dominant themes emerged from the data: planning, implementation, and evaluation of digital library service development.

The planning theme emerged from data containing information on needs analysis, goal setting, feasibility study, budgeting, and external collaboration. The researcher constructed the implementation theme from data related to the decision-making process, task distribution, technical execution, and support from internal and external parties. Meanwhile, the evaluation theme was derived from narratives discussing performance monitoring, user satisfaction levels, service-related constraints, and sustainable development plants. These themes reflect a systematic, data-driven interpretation rather than intuitive classifications.

Planning

Table 2
Digital Service Development Planning Stage

Stages of Digital Service Development	Information	Aspects to Note
Needs Analysis	Analyze the needs of digital services based on proposals from users (teachers, students, parents, and the community)	User aspirations, IT development trends
Determination of Development Goals	Setting the goals for the development of digital services according to the vision and mission of the library and work program documents	Setting the goals for the development of digital services according to the vision and mission of the library and work program documents
Feasibility Study	Conduct a feasibility study taking into account technical, social, and financial aspects	Technical feasibility, social acceptance, cost
Budgeting	Allocating a budget of 5% of the total school budget for the development of digital services	Priority use of the budget
External Cooperation	Collaborate with external parties, such as Kubuku (digital library) and Kamaya (joint catalog)	A partner with the capacity to development

Source: Result of research, 202

Planning for the development of digital services at the Ganesa Library began with a needs analysis of the capabilities of available resources. Hartono and Hum (2016) assert that a comprehensive needs analysis is essential to address the fundamental question of whether digital services need to be developed. However, in practice, the Ganesa Library had not employed a comprehensive SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis. Instead, the identification of development needs relied primarily on informal proposals submitted by stakeholders such as teachers, students, parents, and community members. According to the library head, "Not yet, sir, we haven't done a SWOT analysis, it's just that, sir, we are collecting input and suggestions regarding the needs of school residents to be held in the library." (Informant 2, interviewed, 12 May 2024). These proposals reflected the broad expectation for the library to function as a central and dynamic information hub. Librarians compiled these inputs and discussed them internally as a basis for determining the next steps, followed by coordination with the school leadership.

This participatory, user-driven planning approach highlights the importance of responsiveness and inclusiveness in identifying service needs. However, the absence of formal analytical tools limits the strategic foresight and evaluative precision that a structured method such as SWOT can offer. Compared to Oberg & Schultz-Jones, (2015) best practices in library development planning, which emphasize institutional self-assessment alongside stakeholder input, the Ganesa Library's approach is strong on democratic participation but weak on analytic rigor. The implication is that the

process may be effective for context-specific adaptations but may lack replicability and scalability in more complex institutional settings.

After identifying service needs, the library formulate clear development goals, consistent with Hartono & Hum's (2016) emphasis on the importance of goal-setting as a follow-up to needs assessment. In the Ganesa Library's case, these goals were aligned with the school's vision and mission as well as the library's strategic work program. Notably, the stated goal of becoming an E-Library pioneer indicates an ambitious and future-oriented agenda, aiming to provide fast, easy access to knowledge and support science and technology integration. The clarity and alignment of these goals suggest a well-integrated institutional direction, which is vital for sustaining digital transformation.

To evaluate the feasibility, the Ganesa Library conducted an informal assessment based on three main criteria: cost, interface usability, and user accessibility. These criteria were explored through librarian observations and previous user experiences. Although this practical method demonstrates contextual awareness and real-world sensitivity, it lacks structured measurement tools such as performance indicators, baseline benchmarks, or cost-benefit analyses.

Studies by Chisita et al. (2022) and Bélanger (2025) suggest that formal feasibility studies can enhance decision-making by providing evidence-based projections, especially in resource-constrained environments. Therefore, while Ganesa Library's approach was functional, it represented an intuitive planning model, where decision-making was guided more by operational urgency than by systematic evaluation.

Financially, digital development is supported by a fixed allocation of 5% of the total school budget. However, since this budget must support all library activities, digital transformation efforts are prioritized flexibly. The library employs a phased and priority-based budgeting model, in which urgent services are addressed first, and other procurements are postponed.

The head librarian noted, "Included in the 5% budget from the school, sir, there are no additions or reductions, it's just that the allocation will be flexible according to the needs when used." (Informant 2, interviewed, 12 May 2024). This budgeting strategy aligns with the recommendations by Burger, (2017), who advocates medium-term planning for libraries undergoing digital transitions. The implication is clear: financial adaptability is a critical survival mechanism in digital transformation, especially in educational settings with limited budgetary autonomy.

In terms of external collaboration, the library has partnered with digital service providers such as Kubuku for digital library access and Kamaya for shared catalogue integration. These partnerships serve as strategic responses to internal resource limitations.

As noted by the librarian, "We have a collaboration with Kubuku for digital applications and for online we have Kamaya from the Ministry of Education and Culture for a joint catalogue." (Informant 3, Interviewed, 12 May 2024). This aligns with the findings by Connaway (2015) and Bélanger (2025), who emphasized the strategic importance of external partnerships in expanding institutional capacity. For Ganesa Library, these collaborations are catalysts to overcome internal resource limitations and

accelerate digital service delivery. Practically, this illustrates a scalable model of public-private synergy, where school libraries can leverage third-party solutions to advance technologically without relying solely on in-house infrastructure.

The findings suggested that while the planning process at Ganesa Library might not fully adhere to structured strategic planning models, it reflected a high level of adaptability, responsiveness, and contextual alignment. In theory, this case contributes to discussions on adaptive planning frameworks in school libraries, particularly in the Global South, where rigid models may not always be applicable. In practice, it underscores the value of combining community-based planning with external partnerships and flexible budgeting to sustain progress in digitally transforming library services.

However, it also highlights a key tension between participatory approaches and systematic planning rigor. Without structured evaluation tools and performance metrics, the ability to assess outcomes or replicate success is diminished.

The Librarian explained, "We have not had a specific evaluation of this digital service, but every year we have a major, comprehensive evaluation of the library." and added that, "We only often chat with a handful of students... in general, many of the students said that the existence of this digital service helps them in finding the information they need." (Informant 3, Interviewed, 12 May 2024). Therefore, future planning models should aim to integrate participatory input with structured planning methods, balancing flexibility with accountability.

Implementation

Table 3
Implementation Stage of Digital Service Development

Implementation Stages	Information
Decision	Discuss programs at school meetings; if approved, budget for the current year or the following year if funds are limited
Determination of Operational Steps	Task division based on job description for administration, execution, promotion, and IT
Division of Tasks	The division is carried out based on the ability of librarians to ensure optimal implementation
Operational Implementation	Tasks are carried out without formal procedure operational standards but with complementary systems
Collaboration with IT Teams and External Parties	Assistance from the school's IT team and external parties (e.g., Kubuku and Kamaya) to support the development of the service

Source: Result of research, 2024

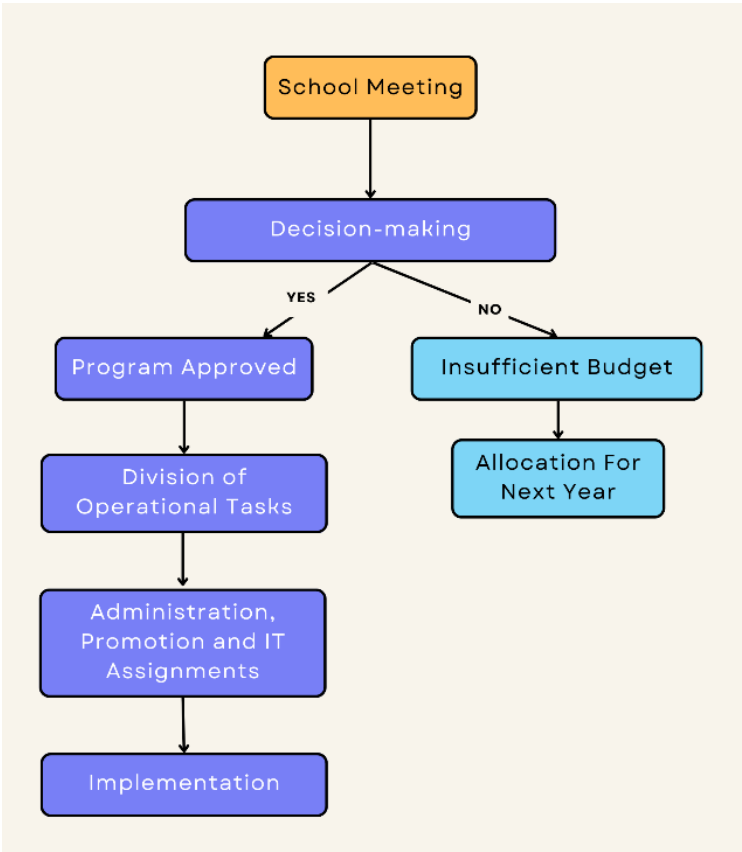


Figure 1. Implementation Flow of Digital Service Development
Source: Result of research, 2024

Implementation is the operationalization of a previously established plan. At Ganesa Library, the digital service development program moves into implementation after a structured planning period. As noted by Abdullah (2014), implementation involves a series of actions that are a follow-up to a program or

policy decision, consisting of three main elements: decision-making, strategic action, and operational execution. In practice, the implementation process at Ganesa Library aligns with this framework.

The first phase, decision-making, is conducted through regular coordination meetings between the librarian and school

authorities. If the program is approved, it is allocated in the current year's budget; if not, it is deferred to the next fiscal year. This phased budgeting strategy is a pragmatic solution to resource constraints and enables continuity without sacrificing financial stability. It reflects what Burger (2017) describes as adaptive financial governance in institutions undergoing service innovation. Mr. Arjun stated, "After receiving the proposal, we discussed it with stakeholders, including the principal, the library director, the librarian, and the treasurer, to determine what we would implement. After that, we implemented it. If there were any shortcomings or strengths, we developed it further." (Informant 3, Interviewed, 12 May 2024). This demonstrates a flexible and collaborative phased approval process.

Following approval, the library enters the execution phase, which involves dividing tasks based on each librarian's competency. Job responsibilities are informally mapped to four core areas: administration, implementation, promotion, and IT support. This functional differentiation allows for more efficient workload distribution. However, in the absence of a written Standard Operating Procedure (SOP), the execution remains informal and flexible.

Librarians are expected to adapt and assist as needed, filling gaps when unforeseen challenges arise. The principal emphasized the importance of a productive and engaging working environment for students, "We strive for fast, accurate, attractive and friendly service. Not just a place to read books but a place to rest, display, to find information and inspiration that is attractively designed." (Informant 1, Interviewed, 18 June 2024). This implementation model, while effective

under certain conditions, raises questions about institutional resilience and sustainability. The absence of SOPs may enable short-term flexibility but limits process consistency, knowledge transfer, and long-term scalability.

Compared to the study by Oberg and Schultz-Jones (2015), emphasizes the importance of clear policy frameworks in school library management. The current model reflects a high-context, experience-dependent approach. This may be efficient in a small team but problematic when staffing changes occur or when broader replication is attempted. Most importantly, Ganesa Library fostered collaborative relationships with internal (school IT team) and external partners (e.g., Kubuku, Kamaya). These partnerships proved crucial in supplying technical support and filling skill gaps. This practice aligns with Connaway's (2015) and Bélanger's (2025) findings, which emphasize the increasing need for multi-stakeholder collaboration. In the Ganesa Library's context, such collaborations bridged expertise deficits and accelerated goal achievement without overextending internal capacity.

Evaluation

Evaluation is essential for libraries to assess whether the formulated objectives have been achieved and to what extent digital services can meet user satisfaction. Evaluation is carried out by recording various obstacles encountered during the development process. Some problems identified during implementation include limited user understanding of the OPAC system, occasional server downtime, and insufficient librarian training in handling technical issues. These challenges are recorded as part of the annual evaluation as a basis for library service improvement and

Table 4
Evaluation Stage of Digital Service Development

Evaluation Aspects	Description	Method
Goal Achievement	Evaluation of the achievement of library digital service objectives	Problem data collection, annual evaluation
User Satisfaction Level	Measure user satisfaction with digital services	Live observation, user feedback
Types of Digital Services	Types of digital services provided: digital library, OPAC, online renewal, internet, etc.	Observation, usage survey
Problems Found	Identifying obstacles in the implementation of digital services	Problem data collection
Sustainable Development	Plans to improve digital services in the future as technology develops	Monitoring the development of science and technology

Source: Result of research, 2024

optimization in the following years. According to Hartono & Hum (2016), the level of user satisfaction needs to be monitored regularly, and the results are used as a basis for decision-making on whether the development of digital services needs to be continued, refined, or even stopped. Currently, the library has not conducted specific research related to the level of digital service achievement but still relies on direct input from users. Even so, based on librarian observations, the available digital services were quite complete and were actively used by users according to their needs. The librarian admitted, “We only often chat with a handful of students. In general, many of the students said that the existence of this digital service helps them in finding the information they need.” (Informant 3, Interviewed, 12 May 2024). The principal also supports the important role of attractive and innovative library services. “For children to feel at home or interested in the library. A place to rest, display, search for information, and get inspiration in an attractively designed library.” (Informant 1, Interviewed, 18 June 2024). This support reflects an effort to create user

experiences that are not only functional but also enjoyable and psychosocially relevant. The digital services developed by Ganesa Library include various facilities such as a digital library, online loan renewals via Instagram direct messages (DM), online OPAC (Online Public Access Catalog), digital circulation services, tablet access, internet and computer facilities, scanning and photocopying services, and audiovisual resources. One notable example of adaptive innovation is the use of Instagram DM as a means of direct communication between librarians and users for book loan extensions. This strategy is considered effective as it leverages a social media platform that is already familiar and widely used among secondary school students, thereby increasing user accessibility and convenience in interacting with the library. This innovation also demonstrates the library’s flexibility and responsiveness in aligning its services with the digital habits of the younger generation. As such, this approach represents a *best practice* that can be a useful reference for other school libraries aiming to enhance user engagement and broaden service outreach

in the digital era. This is in line with the opinion of (Hartono, 2017), who states that the transformation of digital services in school libraries must pay attention to the needs and patterns of information used by students to ensure the relevance and effectiveness of services.

Furthermore, according to IFLA (Ifla, 2015), evaluation of digital services should involve indicators that include accessibility, usability, convenience, and contribution to the achievement of user learning objectives. Therefore, development efforts do not stop at providing facilities, but must also be followed by continuous monitoring and adjustment to the dynamics of information technology development. Ganesa Library of SMA Negeri 1 Cangkringan demonstrated commitment to continuously improve and develop digital services in response to the increasingly complex information needs of the school community.

Obstacles

The development of digital services at Ganesa Library encountered various challenges that comprised three thematic categories: technical, human resources (HR), and managerial constraints. From a technical perspective, the primary obstacle was limited infrastructure due to budget constraints. Although the library received 5% of the school budget, this allocation must support all library operations, making it difficult to prioritize the procurement of adequate digital facilities. To address this, the library adopted a prioritization strategy—allocating funds to the most urgent digital needs—and sought partnerships with external service providers such as Kubuku and Kamaya to reduce internal development costs. From a human resources perspective, the library

only had two librarians responsible for all operational, administrative, and extracurricular library tasks, which significantly delayed the implementation of digital services. Moreover, limited technological competency, especially among senior librarians, hindered the adoption and maintenance of digital tools. In response, the library encouraged collaborative teamwork, promoted knowledge-sharing among staff, and involved the school's IT team to fill technical skill gaps. From a managerial angle, the absence of formal Standard Operating Procedures (SOPs) and the unclear division of responsibilities caused inconsistencies in the implementation of digital services. To overcome this, the head of the library implemented an informal work plan based on job descriptions and mutual agreements while gradually building a more structured workflow. Although the library has introduced digital services such as OPAC, online renewals via Instagram DM, and digital circulation, their utilization is still not optimal due to limited librarian availability and users' unfamiliarity with the technology. Therefore, in addition to improving internal systems, the library aimed to intensify user education and promotion to increase digital service engagement. Through this structured approach, the Ganesa Library strived to improve its services despite existing limitations continuously.

Solution

The development of digital services at Ganesa Library faced several challenges that categorized into technical, human resource, and managerial constraints—each requiring a specific strategic response. From a technical perspective, the primary

issue was the limited infrastructure due to financial constraints. Although 5% of the school budget was allocated to the library, this amount must cover all operational needs, leaving little room for digital innovation. To address this, Ganesa Library adopted a flexible and phased budgeting strategy in which the procurement of digital service components was prioritized based on urgency. If necessary, non-essential procurements were postponed to the following fiscal year. This approach ensures financial continuity while allowing the digital development agenda to progress gradually, aligning with best practices in medium-term library financial planning (Burger, 2017).

From the human resources perspective, the library encountered two librarians were responsible for managing all services, including non-library school tasks. Limited technological proficiency, especially among senior librarians, hindered the optimal use of digital tools. In response, the library encouraged active participation in such as workshops, seminars, and free online training provided by regional libraries, government institutions, or the private sector. To strengthen internal capacity, the library also fostered a culture of mutual support, where librarians assisted one another in daily tasks, ensuring continuity of service. This cooperative culture promoted efficiency and shared responsibility in achieving the library's goals.

From a managerial point of view, challenges include the absence of Standard Operating Procedures (SOPs) and unclear division of tasks, which affect implementation consistency. To cope with this, the Ganesa Library emphasized effective communication and collaborative coordination in assigning roles and

managing operations. Regular internal discussions helped clarify responsibilities and aligned actions with shared objectives. According to Glusker et al. (2022), fostering open dialogue and mutual respect builds a positive organizational culture, which is essential for resolving conflicts and sustaining team harmony. By institutionalizing structured communication and promoting a collaborative work ethic, the library mitigates management-related obstacles while enhancing the reliability of its digital service implementation.

This study contributed to the academic discourse on digital service development in school libraries by emphasizing the significance of participatory planning and adaptive management as strategic foundations for effective service transformation. The case of Ganesa Library illustrated how inclusive stakeholder engagement, flexible budgeting mechanisms, and collaborative partnerships could enable successful digital service development, even in contexts with limited institutional resources. The practical implication of this study is that other schools may adopt similar collaborative and resource-conscious models to develop digital services without incurring high operational costs. Accordingly, this study offered theoretical insights and a replicable practical framework for advancing digital service provision in school-based library environments.

CONCLUSION

The strategy for developing digital services at the Ganesa Library of SMA Negeri 1 Cangkringan includes three main stages, namely planning, implementation, and evaluation. At the planning stage,

needs analysis, goal setting, feasibility study, budgeting, and determining the form of cooperation are carried out. The implementation stage includes determining the type of digital services developed and the division of operational tasks. Evaluation is performed periodically by recording various problems and conducting annual evaluations. This process faces challenges such as budget constraints, limited human resources, and suboptimal librarian information technology skills, especially among senior staff. Moreover, the utilization of digital services by users is still not optimal. To surmount these obstacles, various strategic steps are taken, such as attending workshops and seminars, complementing each other's shortcomings in the team, maintaining good communication, and flexible budget management. These strategies are expected to increase the effectiveness and quality of digital services in the library. This study has limitations because it only focuses on one case study and does not involve library service users. Therefore, further research is recommended to involve various types of libraries and obtain perspectives from service users so that the results are more comprehensive and can be generalized.

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