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Going Hybrid: Assessing the Impact of Adopting Emerging Library Technologies in the Academic Libraries in Region XII

Ana Liza C. Santañez[1*] and Garry L. Bastida[1]
[1]*University of Mindanao*
[*]*a.santanez.550080@umindanao.edu.ph*

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ABSTRACT

This study explored the readiness of academic libraries in Region XII to adopt emerging technologies within a hybrid library environment. Using a phenomenological research design, the study investigated the lived experiences of fifteen head librarians and library directors from selected academic institutions that had implemented emerging technologies over the past three years. Data were gathered through in-depth interviews using a validated researcher-made interview guide. Findings revealed that academic libraries have gradually integrated technologies such as digital repositories, automation systems, cloud-based services, and electronic resources to improve access to information and enhance library operations. However, challenges including limited funding, inadequate infrastructure, poor internet connectivity, insufficient training, and technological gaps continue to affect implementation. Despite these barriers, librarians demonstrated resilience, adaptability, and commitment to digital transformation. The study highlights the importance of institutional support, continuous professional development, strategic planning, and sustainable technology integration in ensuring that academic libraries remain relevant, innovative, and user-centered in the digital age.

Keywords: *Academic libraries; emerging technologies; digital transformation; hybrid library model; phenomenological study*

INTRODUCTION

Libraries have always been a cornerstone of education, research, and community engagement, and their importance continues to grow in an era of rapid technological change. Library emerging technologies are new, innovative digital tools adopted to improve information access and research, such as the use of AI & chatbots, RFID, cloud-based library systems, mobile applications, digital repositories, makerspaces & 3D printing, smart libraries, and the internet of things and virtual reality (Inamdar, 2022). The transition to a hybrid model in higher education presents a complex array of challenges and opportunities, particularly for academic libraries that must evolve their roles in a digital-first landscape. As institutions struggle to balance traditional services such as physical collections and in-person reference support with the growing demand for online resources and virtual learning environments, libraries are at a critical crossroads. The rapid adoption of digital technologies has shifted information access from physical spaces to online platforms, leading to the risk of separate users who prefer traditional libraries and social experiences (Nasir & Tyagi, 2023).

While digital resources have expanded access, most libraries nowadays use emerging technology in their system. They have started using Radio Frequency Identification (RFID) technology, which has changed library tasks (Sagib & Al Maskari, 2020). Moreover, they highlight the digital divide, in which socio-economic factors

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limit some students' ability to engage fully with online materials (McCarty & Swain, 2021). In some state universities in the Sulu province, it is suggested that libraries need to adopt new technology that will allow them to operate efficiently and effectively, increasing their productivity and improving their user services without adding personnel, and it is recommended that purchasing updated technology is necessary for faster, more affordable, and user-friendly delivery of various library services (Tahil,2021).

Moreover, significant progress has been made in the adopting of emerging technologies in North Cotabato, but challenges such as limited infrastructure and connectivity persist. Despite these obstacles, libraries have made strides in integrating emerging technologies to improve their services and students' faculty's access to information (Lagas & Isip, 2023).

The importance of this study is extended to the concept of librarianship in terms of the readiness of academic libraries to adopt emerging library technologies, especially regarding the different challenges and opportunities encountered.

To provide the theoretical basis for present study, the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Diffusion of Innovations theory have been foundational to understanding organizational readiness for technological change. While providing valuable insights, these theories may not fully capture the intricate dynamics of academic libraries and their journey of hybridization. Thus, a theoretical gap exists in the comprehensive understanding of academic libraries' readiness to adopt emerging technologies within the unique context of hybridization.

The Technology Acceptance Model suggests that user acceptance of hybrid models hinges on ease of access and perceived usefulness. Thus, as academic libraries navigate this hybrid shift, they must consider strategies to enhance user engagement, ensure equitable access to resources, and maintain libraries' essential role of community hubs for learning and collaboration (Davis, 1989). Furthermore, Rogers's (2003) Theory of Diffusion of Innovations provides a theoretical lens, suggesting that user adoption follows a bell curve, with innovators and early adopters paving the way for the majority.

This theory forms a foundation for understanding the dynamics of user adoption of emerging technologies. Studies such as a spectrum of user responses, ranging from enthusiastic adoption to resistance, pose a complex challenge for libraries seeking to align with technological advancements. Smith & Johnson's (2020) and Vimalkumar et al.'s (2021) global- perspective study identified a digital divide in user adoption, with distinct patterns across regions. Smith & Johnson (2020) specifically delved into augmented reality adoption, highlighting the need for a nuanced understanding of user preferences and concerns.

The works of the International Federation of Library Associations and Institutions (IFLA) have outlined global trends, and offered insights into the challenges libraries face worldwide (IFLA, 2022). Numerous studies have explored technology integration in academic libraries, emphasizing the shift from traditional to digital environments. Previous research has shed light on the positive impacts of technology adoption, ranging from enhanced accessibility to a wider range of learning resources.

However, a nuanced understanding of the challenges faced by academic libraries, both practically and theoretically, remains scarce. The implications of these previous works underscore the need for a targeted investigation into the readiness of academic libraries, specifically regarding the integration of emerging technologies within a hybrid model. Libraries' fundamental goal is to serve their users efficiently and effectively. Thus, libraries should offer inclusive, high-quality resources for learning, research, and enrichment that remain available, even as they adopt new technologies and techniques, so that people can obtain information with ease by utilizing these technologies (Ganesamoorthy & Selvakamal, 2024).

Studies have revealed that many technologies have emerged for use by library information professionals, but still need to be fully implemented in some public libraries operated for academic purposes. Even when some are offered, the extent of utilization still needs improvement. Moreover, the challenges information professionals encounter in this regard includes a lack of necessary skills and knowledge to effectively utilize emerging technologies, cybersecurity threats to the protection of sensitive information and library resources, and a lack of equitable access to and usability of emerging technologies (Owate, 2023). Rapid technology evolution and

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adoption are making it essential for schools, colleges, and universities to digitalize the tools and services they use and provide on their campuses to make a quick and successful digital transformation (Rullo, 2022).

The digital transformation itself may be debated among higher-ed leaders. Still, there is no denying that changes in culture, workforce, and technology are critical in ushering forth new teaching, learning, and operational models at institutions across the globe (Ascione, 2022).

In Oyedokun (2023), the author pointed out that despite the multiple issues confronting Nigerian academic libraries, there are opportunities to identify and deploy new and emerging technologies to provide library services while remaining relevant to society. One of the major elements that will save libraries is the availability of Open-Source Emerging Technologies (OSET). Managing automated library systems and other information management technologies in developing countries is difficult due to a lack of resources that would allow them to access technological tools as efficiently as in developed countries. Although modern technologies have many advantages for libraries, various barriers prevent libraries from using these resources effectively and efficiently.

The main barriers to the effective use of technological resources in Nigerian libraries include a lack of search skills, inadequate budgets, epileptic power supply, and insufficient management training and staff retraining. Adopting new technologies has been hampered by insufficient funding, limited capacity, and erratic power supplies (Oyedokun, 2023). Lubanga and Mumba (2021) also stressed that several obstacles prevent libraries from implementing high-end technologies, including a lack of well-established centers for research and innovation, the unpredictable nature of technological advancement in the twenty-first century, and university cultures that discourage research and innovation. Furthermore, the largest barriers to adopting new technology are a lack of funding, a shortage of power, and inadequate maintenance. Both information costs and quality are increasing. Fiscal restraints, insufficient maintenance, cultural updating, and a problem with record conversion can be linked to infrastructure problems, a lack of informatics/learning, and a lack of government assistance (Saibakumo, 2021).

It is recommended that the full implementation of policies for establishing and incorporating modern technologies in libraries be carried out. Increased funding for libraries and ongoing training and retraining of librarians on how best to adopt emerging technologies in libraries (Ehoniyotan & Amzat, 2023). While extant literature provides valuable insights into technology adoption in academic libraries, a noticeable gap exists in addressing the holistic readiness of these institutions for the hybridization journey. This research sought to bridge this gap by scrutinizing the intersection of traditional and emerging technologies within the academic library context. The gap becomes evident in the lack of studies that systematically examine the factors influencing organizational and technological readiness and the implications of such readiness on user experiences and library services.

Additionally, this study addressed Sustainable Development Goal (SDG) 9, which focuses on industry, innovation, and infrastructure. The findings of this study contributed to strengthening digital infrastructure, improving access to information, fostering innovation, and reducing knowledge disparities by helping to build an inclusive, knowledge-driven society. Libraries play a pivotal role in bridging the digital divide and promoting sustainable development through technology-driven access to knowledge. This study explored the dynamic landscape of academic libraries, focusing on a phenomenological inquiry into their preparedness to adopt a hybrid model that integrates traditional and cutting-edge technologies. By investigating the readiness of academic libraries to adopt emerging technologies, this research aimed to provide insights to inform strategic decisions and enhance libraries' role in the digital age. This study identified the different emerging library technologies of their institutions.

This investigated library readiness to adopt emerging technologies in Region XII, specifically, discovered the challenges and opportunities encountered during the process, and the benefits of adopting the different emerging technologies. Furthermore, the research findings' significance contributed to enhancing academic libraries by investigating their readiness to adopt emerging technologies. Understanding the readiness level helps align library services with the evolving technological landscape, ensuring academic institutions remain at the forefront of innovation. For Library administrators, the findings helped them in the strategic decisions related to technology adoption. For Users and Patrons, this can be used to tailor services to meet the overall user experience

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within the libraries. For Researchers, the findings can benefit from the study's methodology and insights. This can provide a foundation for further research and exploration of the different emerging technologies in the libraries.

This study focused on academic libraries within Region XII. Academic libraries included in the study are universities, community colleges, or research institutions. Alternatively, it may encompass a broad range of academic library types. The study focused on academic libraries at a certain stage of technology adoption, particularly those who have already adopted these emerging technologies and early adopters or institutions at the forefront of technological integration. This study defined the scope of emerging technologies as specific technologies like electronic resources. The criteria for categorizing these technologies as "emerging" was clearly outlined. The factors that contribute to the readiness of academic libraries to adopt emerging technologies include organizational, technological, human, and financial aspects.

METHODS

Study Participants

In this phenomenological approach, the target study participants are the selected universities in Region XII that have at least 3 emerging technologies used in their libraries in three years; specifically, the Head/Chief/Director for Libraries of the selected libraries were chosen since they have experience and have agreed to participate in this phenomenon. Excluded from the study were academic librarians, library assistants, library users, other library personnel, and library stakeholders who did not meet the inclusion criteria.

Moreover, researchers could conduct in-depth interviews with 5-10 individuals who had experienced the same phenomenon. Appropriate data-gathering and analysis methods include in-depth interviews, poems, documents, written anecdotes, and other sources (Creswell, 2013). Furthermore, a purposive sampling technique was employed to represent the intended study population better (Tenny et al., 2017).

Purposive sampling involved identifying and selecting individuals or groups who were incredibly knowledgeable about or experienced with the phenomenon (Palinkas et al., 2015). Moreover, this study was conducted in Region XII, and the study participants were the Cotabato Medical Foundation Colleges, INC; University of Southern Mindanao; Notre Dame of Midsayap College; Notre Dame of Kidapawan city; Central Mindanao Colleges; Kidapawan Doctors college; Colegio De Kidapwan; North Valley College Foundation, INC; University of Southern Mindanao – Kidapawan Campus; Notre Dame of Dadiangas University; Ramon Magsaysay Memorial Colleges; Brokenshire College of SOCCSKSARGEN; Notre Dame of Marbel University; South East Asian Institute of Technology and General Santos Doctors Medial School Foundation, INC.

Materials and Instrument

This study utilized a researcher-created interview guide that contained the type of emerging technologies and other related questions to answer the research questions, which were validated by experts prior to its design and implementation. The in-depth interview was designed to gather the informants' experiences with the research topic. Data collection was conducted when the ethics clearance from the University of Mindanao Ethics Review Committee (UMERC) and upon approval from the selected academic libraries in Region XII. Potential study participants were invited for a one-on-one interview, and a letter of consent were sent to them. Once the study participants have confirmed their participation in this research, they were scheduled for an interview.

Design and Procedure

A phenomenology approach was utilized in this research study. This phenomenological approach collected data on the lived experiences of librarians who adopted emerging library technologies in academic libraries in the region. Fifteen Librarians were thoroughly investigated. With this, there was a clear understanding of the phenomenon under study, and data were analyzed across different situations. Phenomenology came from social science and requires a researcher to enter an individual's life world and use the self to interpret the individual's experience (Law et al., 1998). Further, the phenomenological approach aimed to understand the lived

experience, challenges, and opportunities of adopting emerging library technology. A phenomenological approach described the ordinary meaning of a lived experience of a concept or a phenomenon of several individuals (Creswell, 2013).

Furthermore, the objective of this phenomenological research was to extract themes from the experiences of this study's participants and convert these experiences into descriptions to understand the phenomenon and to grasp insights to be shared about it.

In this research, there was a need for careful, diligent, and sensitive handling of the experiences of these study participants. The key role of the researcher was to design, interview, transcribe, verify, report, interpret, and analyze. Further, the primary data for this study were collected through in-depth interviews conducted in settings convenient for the study participants. In addition, to establish credibility, the researcher personally collected the data by visiting selected academic libraries, where librarians were interviewed. In agreement, it was the role of the researcher to go into the field to make descriptions and understand both external observable behavior and internal state (Patton, 2002).

Before data gathering, the researcher crafted an in-depth interview guide with questions that were used. Experts validated this guide to ensure the reliability and validity of expected results. After the validation process, the paper was submitted to the University of Mindanao Ethics Review Committee. Aside from the friendly suggestion and recommendation from UMERC, a final view of the manuscript and interview was drawn. Furthermore, a letter requesting permission to conduct the study was sent to the offices of the selected academic libraries in Region XII. Afterward, the permit to conduct the study was approved; the researcher proceeded to the selected academic libraries to interview their Head/Chief/Director of Libraries. The main activity, an in-depth interview, has been prepared. The mood was set first to make it more comfortable for the study participants to converse.

Furthermore, it was explained to the study participants that the interview aimed to examine the impact of adopting library technologies in their respective academic libraries. With this, the study participants were humbly asked to spend 30 minutes to 1 hour for an interview. Indeed, the study participants were asked to read the interview protocol, which clearly states that they have the freedom to participate and may withdraw at any time during the interview. Furthermore, after the study participants signed the interview protocol, data collection began with one-on-one interviews. Also, permission was requested from the study participant to make an audio recording and take notes. After the data were gathered, the study participants were informed that the researcher was open to suggestions and recommendations if they had further queried or additional answers.

Finally, the in-depth interview wrapped up. Respectively, this study was conducted in 6 months. Furthermore, credibility was given high consideration in this study. The research adviser was consulted during this study, and while data were being collected. One way to enhance credibility was to involve informants (tutees, tutors, or program coordinators from a writing center) in verifying researchers' interpretations after the fact (Stahl & King, 2020). Also, to establish credibility, the study participants were observed during data collection, especially during the actual interview, and no relevant data were excluded, nor were any irrelevant data included. Furthermore, the collected data were appropriately checked, analyzed, and interpreted to ensure they were accurately reflected. Credibility concerned the fit between respondents' views and the researcher's representation of them (Nowell et al., 2017, p. 3).

Moreover, dependability was considered in this qualitative study. To ensure dependability, a record was kept of the translations, transcripts, and audio recordings of all in-depth interviews conducted with the study participants. To ensure dependability, the research process was designed to be logical, traceable, and documented (Nowell et al., 2017, p. 3). Anticipation that there were peer reviews regarding dependability (Stahl & King, 2020). To establish confirmability, subjective opinions, assumptions, and judgments were avoided to prevent data distortion. Stahl and King (2020) state, "In this qualitative circumstance, it makes sense to aim for noninvolvement, lest researchers contaminate pristine, natural environment" (p.28). Thus, only the study participants' opinions shared during the interview were analyzed.

To achieve transferability, a sufficient and prosperous description of the study participants' opinions were gathered by interviewing academic librarians at 15 academic libraries to identify similarities across situations and

ensure that the study results were transferable to other contexts with sufficient detail and accuracy. The sites that may wish to transfer the findings remained unknown.Additionally, a thick description was provided so that those who seek to transfer the findings to their site can judge transferability (Nowell 2017 p.3). Likewise, qualitative researchers maintain that patterns and descriptions from one context may apply to another. If one cannot learn from study extensions that might fit with subsequent set-off circumstances, the impact of the original study is limited (Stahl & King 2020).

Respectively, this research study adhered to the ethical protocols and guidelines set forth by the University of Mindanao Ethics Committee with UMERC Protocol no. (UMERC – 2026 – 146). For ethical considerations, the privacy and confidentiality of the study participants were maintained. With this, Republic Act No. 10173, the Data Privacy Act of 2012, was complied with. Furthermore, data gathering was conducted individually and managed privately. Hence, an interview guide and an audio recorder were assigned, and the identities of the study participants were kept confidential. Also, the data collected from the informant was handled confidentially, and the interview guide, questionnaire, and audio recorder were kept confidential.

In addition, the study participants were informed that the study would protect them from any harm, whether physical, psychological, emotional, legal, financial, or social. Not only that, but the results from the study participants were not shared; they were kept confidential. The researcher ensured that participation was solely voluntary. The study participants were given the freedom to withdraw from this study without any consequences, and they left unharmed after fully understanding its purpose, whether they participated or not.

This study was conducted with formality and adherence to the ethical standards. Hence, a letter was sent to the Head Librarian of the selected academic libraries beforehand, since they were the heads of the academic library, asking for permission to conduct the interview. The research was conducted after approval from the selected academic libraries. The researcher ensured that the study participants consented to conduct the interview and were fully aware of the process. The interview guide questionnaire for this research was noticeably clear and comprehensive.

Thus, the study participants understood the purpose of this study. This study did not involve any risks that the population may experience in physical, psychological, social, economic, or other areas; in addition, the rights of every individual were protected and secured. The outcome of this study significantly benefited their libraries, as the research findings provided them with information on the impact of adopting library technologies in their workplaces.

Moreover, plagiarism was avoided, ensuring that the correct and accurate citation of ideas from other writers and scholars was fully observed. To do this, this study underwent grammatical and plagiarism checking.

Furthermore, the researcher avoided any fabrication by ensuring that there were no made-up tales in the literature reviewed. Thus, all information presented was carefully written and cited. Not only that, but the information sources used in this study were reliable journals and other scholarly works. In addition, falsification and misrepresentation of works were avoided as this study complied with the citation procedure set forth by the American Psychological Association (APA). Thus, the data and information obtained were presented in the most precise manner.

Furthermore, this study did not use any form of deceit or dishonesty to harm the respondents' welfare. In addition, all written information was checked and validated by the panel of experts. Further, there was no conflict of interest in conducting this study, and it was strictly professional with no conditions.

Moreover, the researcher is not familiar with the study participants, which helps avoid potential conflicts of interest. In addition, this research considered the author's qualifications in conducting the research. Further, the researcher, with the help of the research advisor, has substantial input into the concept and design, data gathering, data analysis, and data interpretation. Moreover, the researcher and the research advisor collaboratively drafted and revised the article for significant intellectual content.

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RESULTS AND DISCUSSION

Roles, experiences, and interaction with Emerging Technologies in Academic Libraries In view of the experiences and integration of emerging technologies in academic libraries, five essential themes are developed, as presented in Table 1 on the roles, experiences, and interactions; these include: Emerging Integration of Digital Library Services, Multifaceted Roles of Academic Librarians, Operational Demands and Institutional Pressures, Limited Resources and Gradual Development of Digital Access, and Evolving Work Practices and Technology Integration. These themes reflect the participants lived experiences as they navigate the transition to technology-driven library services.

Emerging Integration of Digital Library Services: Academic libraries are gradually transitioning to digital library services, though most institutions are still in the planning stages of implementation. Participants even emphasize that the introduction of digital materials such as e-journals, e-books, subscription databases, and digitization initiatives, as elaborated in the statement of Participant 1 said Naa mi kanang sa mga ebooks or e journals subscription po like Gale. Some libraries have only recently begun digitization, while others are still exploring available platforms and resources. IDI_IP1 Simliarly, participant 4 said. Nag start last sem lang, I digitize nila in process pa this time. From the participants' narratives, it can be interpreted that academic libraries are currently in a transition phase, shifting from traditional library systems to digital environments. However, this transition remains slow and incomplete, as digital collections and services are still limited. IDI_IP4

Table 1. *Essential Themes and Significant Statements on the Roles, experiences, and interactions with emerging technologies in academic libraries.*

Theme	Core Ideas	Illustrative Quotes
Emerging Integration of Digital Library Services	Gradual adoption of digital services such as e-books and e-journals	Naa mi kanang sa mga ebooks or ejournals… subscription po… Gale (IP1)
	Digital initiatives are still in early or transitional stages	Yung computer electronic materials… open lang siya for the students (IP2)
	Limited but growing use of subscription-based resources	Nag start last sem lang… I digitize nila… in process pa this time (IP4) Ebooks… new for our library… started this year lang (IP5)
Multifaceted Roles of Academic Librarians	Librarians manage and organize library resources	Provide learning materials sa mga student also sa faculty and staff (IP2) Managing
	Provide support to students, faculty, and staff	this library… tatlo raman mi librarian diri (IP3) Managing and organizing library resources, assisting student and faculty
	Perform administrative and operational functions	(IP5) Oversee all operations… staff management, planning, and resource acquisitions (IP6)
	Lead and supervise library systems and services	Leading, supervising, managing the entire library system (IP7)
Operational Demands and Institutional Pressures	Workload is increased due to accreditation requirements	Preparation namo for accreditation… naa pamay mga backlogs (IP1)
	Limited staffing intensifies job responsibilities	Masayadong pressure… hinay hinay ang digital implementation (IP4)
	Administrative demands create pressure on librarians	Tatlo raman mi librarian diri (IP3)
Limited Resources and Gradual Development of Digital Access	Digital collections remain limited and incomplete Dependence on free access	Free access link sa teachers and students… di pana complete (IP4)
	Partial subscriptions Budget constraints affect resource availability	Ebooks lang po meron kami now… tipid kami (IP5)

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		Sa amo website nay free open access journals (IP1)
Evolving Work Practices and Technology Integration	Work routines now include digital management tasks	Monitoring… cataloging… preparation for accreditation (IP1)
	Increased use of automation and digital systems	Managing budgets… planning technology implementation (IP6)
	Technology integration accelerated during and after the pandemic	Automation… since 2012… AI-driven services during pandemic (IP7) Digital repository na cloud… para ma store nako (IP3)
	Adoption of digital repositories and cloud-based storage	

The findings reveal that while academic libraries are gradually adapting to the increasing demands of digital information access and online learning environments, the pace of digital transformation remains constrained by institutional limitations, including inadequate funding, limited technological infrastructure, and varying levels of organizational readiness. Digital libraries developed as universities gained technological readiness and digital infrastructure (Moonasar, 2025). Likewise, academic libraries are still undergoing a gradual digital transformation due to challenges related to funding, infrastructure, digital literacy, and institutional readiness (Cabasag & Cabasag, 2025; Odunlade & Ojo, 2023). Similarly, academic libraries increasingly integrate electronic resources (books, journals, and online databases) to make them available online, supporting research productivity and remote learning, so that users can access the library even in their own homes (Francis, 2023)

Multifaceted Roles of Academic Librarians

This theme reveals that librarians perform a wide range of responsibilities beyond traditional book management, including resource management, user assistance, operational oversight, and the implementation of digital technologies. Statements such as: Managing and organizing library resources, assisting students and faculty.

Some of the Librarians are managing, supervising, and even participating in the organization of library resources and assisting students and faculty. IDI_IP5.

Similarly, participant 7 said.

Leading, supervising, and managing the entire library system.

Most library managers are into leading, supervising, and managing the entire library operation in their respective institutions. IDI_IP7

The responses indicate the expanding professional responsibilities of librarians in academic institutions, showing that they are increasingly involved in technology integration, system management, and administrative leadership alongside their traditional responsibilities.

These findings support the view that academic librarians' roles have become increasingly dynamic and multifaceted in response to the growing integration of digital technologies in education. Saunders (2015) emphasized that modern librarians must develop strong digital competencies to effectively manage evolving information environments, while Aharony (2018) highlighted the important role of librarians in facilitating access to digital information and promoting user engagement. Similarly, Pal (2025) explained that librarians now function not only as custodians of information but also as educators, technology facilitators, leaders, and coordinators who support learning, institutional operations, and digital transformation within academic environments.

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Operational Demands and Institutional Pressures

This theme highlights the significant workload pressures librarians face, including accreditation preparation, increased administrative responsibilities, institutional expectations, and limited personnel, which collectively contribute to heightened workplace pressure and operational challenges.

The study reveals that librarians experience significant work overload as they struggle to balance traditional library responsibilities with digital implementation initiatives, accreditation requirements, and increasing institutional compliance demands. Participants 1 and 4 said.

Preparation namo for accreditation, naa pamay mga backlogs (IP1). and Masyadong pressure...hinay hinay ang digital implementation. (IP4).

The libraries still have several backlogs that need to be addressed in their accreditation, and there is too much pressure on the gradual implementation of digitization. IDI_IP1 and IP4.

From the narrative statements, it can be inferred that institutional demands significantly influence the pace and effectiveness of technology integration in libraries, reflecting the stress and operational challenges associated with digital transformation.

These findings indicate that academic librarians experience increasing workload pressures due to institutional accountability, accreditation requirements, administrative expectations, and ongoing digital transformation initiatives. Tenopir et al. (2017) observed that growing institutional expectations and technological demands contribute significantly to workplace stress and operational strain among librarians, while Odunlade et al. (2023) emphasized that limited staffing, accreditation processes, and digital transitions intensify pressures that affect service delivery and innovation in academic libraries. Furthermore, Rahman et al. (2025) highlighted that administrative pressures and performance expectations directly influence library productivity, suggesting that librarians must continuously balance traditional services with institutional compliance and technology-driven responsibilities despite workforce and resource limitations.

Limited Resources and Gradual Development of Digital Access

This theme highlights the financial and resource-related challenges faced by academic libraries in sustaining comprehensive digital collections, subscription-based databases, and advanced technological systems. Participants emphasized that limited budgets and resource constraints limit the expansion of digital access, resulting in partial subscriptions and a greater reliance on open-access resources to meet the information needs of students and faculty. Participants 1 and 5 said.

> *Ebooks lang po meron kami now, tipid kami (IP5), and Sa amo website nay free open access journals (IP1).*
>
> At present, thier library only provides e-books as a cost-saving measure and thier library websites offers free open-access journals for users. IDI_IP1 & IP5.

From the responses, it is evident that financial and resource constraints significantly affect the availability, expansion, and full implementation of digital library services, leading to partial subscriptions, limited electronic collections, and greater reliance on open-access platforms. These findings suggest that budget constraints directly influence libraries' capacity to adopt emerging technologies, maintain up-to-date digital infrastructure, and sustain comprehensive subscription-based resources. This observation is supported by Fakoyede et al. (2026), who emphasized that financial constraints remain a major barrier to digital library development, particularly in developing institutions, while Onunka et al. (2023) noted that insufficient funding restricts libraries' ability to maintain modern technological systems and updated electronic collections. Similarly, Liu (2020) explained that many academic institutions increasingly rely on open-access resources as practical, cost-effective alternatives to expensive subscription databases, reflecting the ongoing financial challenges associated with libraries' digital transformation.

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Evolving Work Practices and Technology Integration

This theme reflects the transformation of librarians' work practices due to technology, wherein participants shared that their responsibilities now extend beyond traditional library tasks to include digital cataloging, system monitoring, management of online repositories, accreditation preparation, and increasing administrative responsibilities, resulting in significant workload pressures intensified by limited personnel and institutional demands. Statements like:

> *Automation...since 2012, AI-driven services during pandemic (IP7) and Digital repository na cloud...para ma store naku (IP3).*
>
> The library has implemented automation since 2012, introduced AI-driven services during the pandemic, and developed a cloud-based digital repository for the secure storage and management of resources. IDI_IP7; IDI_IP3

The responses indicate that technology adoption in academic libraries accelerated significantly during and after the pandemic, leading to increased use of automation, digital cataloging, integrated library systems, cloud-based repositories, and other technology-supported services that have become central to daily library operations. These findings suggest that academic libraries are increasingly becoming technology-driven environments in which digital tools play a crucial role in sustaining services, improving accessibility, enhancing information management, and supporting institutional continuity during disruptions. This finding aligns with Cox's (2021) observations, which emphasized that the pandemic accelerated digital transformation and encouraged libraries worldwide to adopt technology-based systems to maintain service delivery. Similarly, Bagewadi et al. (2025) explained that automation and integrated library systems improve operational efficiency and transform library workflows, while Corujo et al. (2025) highlighted the importance of digital repositories and cloud technologies in enhancing information preservation and institutional collaboration. Furthermore, Labangon et al. (2025) state that the pandemic reshaped librarians' professional practices by increasing reliance on virtual and digital environments.

Reactions and Significant experiences of Emerging technologies

Considering the initial reactions and significant experiences of Librarians on the emerging technologies adopted and examined, there are four essential themes that are reflected in Table 2, and these are: Limited awareness and dissemination of technologies, Gradual Integration of Digital and AI Technologies, Dependence on Open Access and Alternative Resources, and Need for Training and Capacity Building.

Limited awareness and dissemination of technologies.

The theme reveals that, even though emerging digital technologies and resources are available in higher education institutions' libraries, they remain underutilized due to a lack of dissemination strategies and instruction in digital literacy programs. Participants shared that users are often unaware of existing digital services, as reflected in statements such as:

> *Walay proper dissemination...dili sila aware na naa na diri and Murag singit ra siya...dili siya dedicated na orientation (IP1).*
>
> Emerging technologies are available but underutilized, and there is an Absence of structure and dedicated orientation programs. IDI_IP1

The results indicate that poor communication and a lack of user orientation hinder the full utilization of available digital resources and technologies in libraries. This finding is consistent with the work of Rachman (2025), who stressed that awareness and user education are crucial for the successful use of digital library technologies. Similarly, Oseghale (2023) explained that users do not often make full use of digital resources when institutions lack systematic information literacy and orientation programs. Mutuma (2024) also noted that effective dissemination and user engagement strategies are needed to make digital library systems accessible, visible, and fully utilized by academic communities. Therefore, the results imply that success in Table 2.

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Table 2. *Emerging technologies adopted and examine stakeholders' responses, including initial reactions and significant experiences with their use.*

Theme	Core Ideas	Illustrative Quotes
Limited Awareness and Dissemination of Technologies	Emerging technologies are available but underutilized	Walay proper dissemination… dili sila aware na naa na diri (IP1)
	Lack of proper dissemination limits awareness among users	Kulang pa sa orientation… kaylangan pa ma fully informed (IP4)
	Absence of structured and dedicated orientation programs	Murag singit ra siya… dili siya dedicated na orientation (IP1)
	Users are not fully informed about available digital resources	
Gradual Integration of Digital and AI Technologies	Libraries are slowly adopting digital and AI technologies	Using AI technologies… mas mapadali niya ang work (IP2)
	Implementation of systems such as e-books, OPAC, and automation is ongoing	Ebook palang po talaga ang meron kami… bago lang siya (IP5)
	Technology integration is still in the developmental stage	We embraced automation… online public access catalog (IP7)
	Digital tools are beginning to improve efficiency in library operations	
Dependence on Open Access and Alternative Resources	Libraries rely on open access platforms due to limited resources	Kanang open access… mag hatag kog other way sa ilaha (IP3)
	Use of alternative tools compensates for lack of subscriptions	Free access… mao lang ang gamitin (IP4)
	Free digital resources serve as primary support for users	Google Drive mao rana gina gamit… alternative (IP3)
	Resource limitations influence service delivery strategies	
Need for Training and Capacity Building	Continuous training is necessary for effective technology use	Staff needed more training… users required guidance (IP6)
	Librarians require skill development in digital tools	We have capacitated our librarian first (IP7)
	Users need guidance in accessing and utilizing technologies	Kaylangan pa ma fully informed… kulang pa sa orientation (IP4)
	Capacity-building initiatives support successful technology integration	

Technology integration is not only a function of the availability of digital tools, but also effective dissemination and awareness initiatives for users.

Gradual Integration of Digital and AI Technologies

The theme suggests that academic libraries are gradually adopting emerging technologies, such as e-books, automated systems, online public access catalogs (OPACs), and AI-supported tools, to improve operational efficiency and service delivery. Participants described the technology implementation as being in the developmental stage, as elaborated in the statements:

> *Ebook palang po talaga ang meron kami...bago lang siya (IP5) and We embraced automation...online public access catalog (IP7).*

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Implementation of systems such as e-books, OPAC (IDI_IP5), and automation is ongoing, and Technology integration is still in the developmental stage. IDI_IP7.

The results show that libraries recognize the significance of digital transformation but are reluctant to embrace technology due to institutional readiness and resource constraints. This finding supports Ikwuanusi et al.'s (2024) observations that automation systems and integrated digital technologies substantially enhance library workflows and operational efficiency. Similarly, Sharma et al. (2024) have noted that academic libraries are increasingly embracing digital and AI technologies to meet the changing demands of education and information services. Also, Adewojo et al. (2026) have observed that new technologies and AI-based services are transforming library practices and improving access, efficiency, and user support in contemporary academic settings.

Dependence on Open Access and Alternative Resources

The themes reflect the limited financial resources available to libraries and their reliance on alternative tools and on freely available digital platforms. The participants said that they use open-access resources and free storage platforms, as shown in statements such as:

Free access...mao lang ang gamitin (IP4) and Google drive mao rana gina gamit...alternative (IP3).

Use of alternative tools compensates for lack of subscriptions (IDI_IP4), and Free digital resources serve as primary support for users. IDI_IP3

The findings reveal that libraries' service delivery approaches are highly influenced by resource constraints, and institutions are compelled to seek cost-effective alternatives to providing user support. This finding is consistent with the work of Tor-Akwer et al. (2025), who argued that budget constraints play a major role in the development and sustainability of digital library services. Similarly, Onunka et al. (2023) noted that many academic libraries use open-access resources due to the high cost of maintaining subscription databases and advanced technologies. Institutions are also turning to alternative digital platforms and open-access systems as practical solutions to financial and technological constraints (Mhlanga, 2024). The findings, therefore, suggest that open-access resources and alternative digital tools have emerged as critical mechanisms for maintaining access to information and library services during periods of constrained institutional resources.

Need for Training and Capacity Building

The theme underscores the importance of continuous professional development and user education to ensure effective technology integration in academic libraries. Staff training

and user guidance were reported to be critical by participants, as reflected in statements such as:

Staff needed more training...users required guidance (IP6). We have capacitated our librarian first (IP7)

The Directors of library emphasized that staff required additional training and users needed proper guidance in utilizing digital technologies, prompting institutions to prioritize the capacity-building and professional development of librarians first. IDI_IP6; IDI_IP7

These findings suggest that both librarians and users need sufficient technological knowledge and competencies to maximize the benefits of digital systems and emerging technologies. This finding is consistent with Thiruppathi's (2024) work, which notes that librarians must continually develop digital competencies to effectively meet the needs of changing information environments. Likewise, Nakaziba et al. (2024) noted that capacity-building initiatives and professional training are critical to the success of digital transformation in academic libraries.

Furthermore, Onunka et al. 2023) stressed the need for ongoing education and training in technology so that librarians can respond to users' changing needs, improve service quality, and sustain innovation in library systems. The findings of this study indicate that continuous training, orientation, and capacity-building activities are important for improving technology use and making digital library services more efficient.

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Challenges in adopting technologies and the strategies support mechanism

Considering the challenges of librarians in adopting technologies and the strategies support mechanism, there are five essential themes that are reflected in Table 3, and these are: Financial constraints and resource allocation, technical and infrastructure challenges, training gaps and capacity limitations, low utilization and dissemination issues, and adaptive strategies and institutional support mechanism.

Financial Constraints and Resource Allocation The theme suggests that budget constraints remain a major obstacle to the acquisition and implementation of new technologies in academic libraries. The cost of e-resources, AI systems, subscriptions, and digital infrastructure was another barrier to the adoption of advanced technologies that participants emphasized such as:

Table 3. *Challenges encountered in adopting technologies and the strategies or support mechanisms used*

Theme	Core Ideas	Illustrative Quotes
Financial Constraints and Resource Allocation	Budget limitations affect acquisition of emerging technologies High cost of e-resources and systems restrict adoption Financial prioritization and reallocation are necessary Institutional support influences sustainability of technology use	Budget… primary challenge (IP6) First is the budget (IP7) Dili siya basta basta kahit limited ang budget (IP5) Kung wala budget… dili maka try sa AI systems (IP3)
Technical and Infrastructure Challenges	Unstable internet connectivity affects access to digital resources Lack of troubleshooting skills among staff System maintenance and technical issues disrupt services Dependence on IT support for system functionality	Dili ta kabalo kung stable ba ang internet (IP2) Kung wala kay internet dili ma access (IP3) Dili man ta tanan kabalo sa troubleshooting (IP4)
Training Gaps and Capacity Limitations	Limited training opportunities hinder effective technology use Need for continuous professional development Users require guidance in accessing digital services Training enhances both staff competence and user utilization	Wala puy training ani… wala ko kabalo (IP3) Training provided… bagong system (IP2) Users struggling to access ebooks (IP5)
Low Utilization and Dissemination Issues	Technologies are underutilized despite availability Lack of awareness among students and faculty Poor dissemination limits engagement Need for stronger implementation and promotion strategies	For display purposes ra siya… dili ginagamit (IP1) Wala gyud siya ginagamit sa students (IP1) Wala sila kabalo… dili sila aware (IP1)

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Adaptive Strategies and Institutional Support Mechanisms	Innovation and creativity compensate for limited resources Use of open access and alternative tools as solutions Collaboration and partnerships strengthen implementation Training, support systems, and advocacy improve adoption	Innovation nalang gyud… be creative (IP4) Institution supportive… requesting systems (IP2) Trainings, workshops, IT support (IP6) Sacrifice other budget components (IP7)

Budget...primary challenge (IP6)
Kung wala budget dili maka try sa AI system (IP3)

Budget limitations significantly affect the acquisition and implementation of emerging technologies, while strong institutional support plays a crucial role in sustaining and expanding the use of technology in academic libraries. IDI_IP6; IDI_IP3.

The results suggest that financial prioritization and institutional support are essential to the sustainability and expansion of technology-based library services. This finding is consistent with the work of Ketheesware et al. (2024), who argued that financial constraints significantly hinder the development of digital library systems, particularly in resource-constrained institutions. Kakiri et al. (2024) similarly found that libraries are unable to purchase new technologies, electronic collections, and subscription databases due to lack of funding. Furthermore, Odularo (2025) stated that the adoption of sustainable technology in libraries depends on institutional investment, strategic budgeting, and long-term financial support. In general, the results suggest that financial capacity is an important determinant of libraries' ability to adopt and sustain emerging technologies and digital services.

Technical and Infrastructure Challenges. The theme reveals that unstable internet connectivity, limited technical expertise, and system maintenance issues largely affect the effectiveness of digital library services. Participants expressed concerns such as:

Dili ta kabalo kung stable ba ang internet" (IP2) and "Dili man ta tanan kabalo sa troubleshooting" (IP4)

Unstable internet connectivity and dependence on IT support significantly affect the accessibility and functionality of digital library resources and systems. IDI_IP2; IDI_IP4

These results suggest that reliance on internet connectivity and IT support creates operational vulnerabilities that could compromise access to digital resources and online services. This finding corroborates Odularo's (2025) observation that reliable technological infrastructure and technical

support is critical to sustaining digital library operations. Similarly, Moonasar (2025) observed that technological disruptions and lack of technical competencies remain common challenges in the digital transformation of academic libraries. Furthermore, Stefan et al. (2024) explained that for digital systems to be implemented successfully, stable internet access, effective system maintenance, and continuous technical assistance are required. The findings thus indicate that the reliability of infrastructure and technical readiness are significant factors for the efficient and uninterrupted provision of digital library services.

Training Gaps and Capacity Limitations. The theme reveals that insufficient training opportunities and limited professional development opportunities are barriers to the effective use of digital technologies in academic libraries. Participants mentioned problems in using new systems and assisting users in their statements, such as:

Wala puy training ani...wala ko kabalo (IP3) and Users struggling to access ebooks (IP5).

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Limited training opportunities hinder the effective use of technology, while continuous training enhances both staff competence and user utilization of digital services. IDI_IP3; IDI_IP5

These findings suggest that both librarians and users need continuing guidance, orientation, and skill development to maximize the benefits of digital resources and technologies. This is consistent with the work of Diseiye et al. (2024), who emphasized the importance of continuous development of digital skills by librarians to effectively manage emerging information technologies. Similarly, Nakaziba et al. (2024) stressed that professional development and capacity-building programs are critical components of successful digital

transformation in academic libraries. Khoeini et al. (2024) pointed out that ongoing training enhances technology skills, strengthens user support services, and prepares librarians to face the changing digital world. The findings generally indicate the need for training and capacity building to improve staff competence and user engagement with digital library services.

Low Utilization and Dissemination Issues. The theme indicates that available technologies and digital resources are underutilized due to limited user awareness and ineffective dissemination strategies. Participants said that some technologies exist but are not used actively, as seen in statements like

For display purposes ra siya… dili ginagamit" and "Wala sila kabalo… dili sila aware" (IP1)

Technologies remain underutilized despite their availability, highlighting the need for stronger implementation, dissemination, and promotion strategies. IDI_IP1

The results show that the lack of effective promotion, orientation, and implementation strategies prevents students and faculty from fully benefiting from the digital resources and services available to them. This finding is consistent with the observations of Haider et al. (2025), who highlighted the importance of fostering user awareness and engagement with digital library technologies. Similarly, Tim et al. (2023) stated that digital systems are ineffective if users are not well informed or oriented about their availability and functions. Moreover, Mutuma (2024) noted that user participation and information dissemination strategies are significant for enhancing the use and effectiveness of electronic resources in academic institutions. The findings thus call for stronger dissemination programs and promotional strategies to improve awareness, engagement, and utilization of digital library technologies.

Adaptive Strategies and Institutional Support Mechanisms. The theme underscores libraries' use of innovation, creativity, collaboration, and institutional support to overcome resource limitations and sustain technology integration initiatives. Participants described adaptive practices such as alternative tools, asking for institutional help, and prioritizing training and IT support, as illustrated by the following statements:

Innovation nalang gyud… be creative" (IP4) and "Trainings, workshops, IT support" (IP6)

Innovation and creativity help compensate for limited resources, while training, support systems, and advocacy initiatives improve technology adoption and sustainability. IDI_IP4; IDI_IP6

These findings imply that libraries need to develop flexible and collaborative approaches to continue digital transformation and sustain services amid financial and operational challenges. This observation is consistent with the work of Aslam et al. (2025) who stressed that innovation and collaboration are important strategies for sustaining library services in evolving technological environments. In a similar vein, Stanwicks (2024) explained that the successful implementation of library technologies is strengthened through institutional support, strategic planning, and collaborative partnerships. Lee (2025) also pointed out that professional development programs, support systems, and organizational commitment are important to increase technology adoption and operational resilience in academic libraries. Overall, the findings suggest that adaptive strategies and institutional support mechanisms are crucial in addressing challenges and enabling the sustainable integration of technology within the academic library setting.

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Opportunities and benefits of Emerging technologies

In the context of the challenges of librarians in the adoption of technologies and the strategies support mechanism, five important themes are reflected in Table 4 and they are: enhanced access and retrieval of information, improvement of library services and user experience, strengthening collaboration and academic engagement, innovation and professional growth opportunities, and underutilized potential because of limited awareness.

Table 4. *Opportunities and benefits of emerging technologies in enhancing library services, supporting academic work, and improving access to information.*

Theme	Core Ideas	Illustrative Quotes
Enhanced Access and Retrieval of Information	Improves accessibility of resources anytime and anywhere	Daghan unta ma kuha for research… pero wala na disseminate (IP1)
	Enables faster searching and retrieval of information	Maka access anytime… stored ang collections sa system (IP2)
	Expands availability of digital collections for research	Ma access bisan sa balay… dali ang searching (IP7)
Improvement of Library Services and User Experience	Enhances efficiency of library operations	Improving library services… supporting teaching and learning (IP3)
	Improves quality of services delivered to users	Another improvement… mag karoon ng ebooks (IP5)
	Supports teaching, learning, and research activities	From traditional to technology-driven services (IP7
Strengthened Collaboration and Academic Engagement	Promotes collaboration between librarians and faculty	Nag collab kami with faculty and program heads (IP5)
	Encourages partnerships with external agencies	Faculty and librarians cooperate… relay information (IP2)
	Increases academic engagement among users	Collaboration with agencies… MOA and inter-library sharing (IP7)
Innovation and Professional Growth Opportunities	Supports data-driven decision-making	Strategic decision-making is more data-driven (IP6)
	Encourages innovation in library services	More time for planning and community engagement (IP6)
	Enhances professional development of librarians	Nag level up ang users and services (IP7)
Underutilized Potential Due to Limited Awareess	Lack of dissemination limits utilization of technologies	Wala na disseminate… dili sila aware (IP1)
	Low awareness among students and users	Dili nila magamit kay wala sila kabalo (IP1)
	Available resources are not maximized	

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Enhanced access and retrieval of information

The theme explores how emerging technologies improve the accessibility, availability, and retrieval of academic resources in library environments. “Digital systems allow users to get information anytime and anywhere," participants stressed in statements such as:

> *Maka access anytime… stored ang collections sa system” (IP2) and “Ma access bisan sa balay… dali ang searching” (IP7)*
>
> Emerging technologies enable faster searching and retrieval of information while expanding the availability of digital collections for research purposes. IDI_IP2; IDI_IP7

These findings imply that the application of technology increases research capacity, improves access to digital resources, and increases the speed of information retrieval for instructors and students. This finding is consistent with the findings of Mamambolo et al. (2023) who emphasized how digital libraries enable access to academic materials from a distance and enhance information access. Similarly, Rafi et al. (2019) stated that digital databases and electronic resources facilitate research output and information retrieval effectiveness in academic institutions. In addition, Rezaei et al. (2025) observed that digital technologies alter user information-seeking behaviors by offering faster, easier, and more flexible access to academic content. The results as a whole reveal that new technologies are very important for improving information access and strengthening research support services in university libraries.

Improvement of Library Services and User Experience

The theme indicates that emerging technologies can greatly improve the efficiency and quality of library operations and services. Digital innovations support teaching, learning, and research, according to the comments received from participants:

> *Improving library services… supporting teaching and learning” (IP3) and “From traditional to technology-driven services” (IP7)*
>
> Technology integration enhances the efficiency of library operations and strengthens support for teaching, learning, and research activities. IDI_IP3; IDI_IP7

The findings indicate that adopting technology helps libraries evolve from traditional service models to more responsive, efficient, and user-centered systems. This finding supports the observation of Bagewadi et al. (2025), which states that automation and integrated library systems increase the operational efficiency and user service delivery. Likewise, Meesad et al. (2024) stressed that technology-driven library services enhance user engagement and the overall library experience. Adeshina (2024) also added that the use of digital technologies enhances teaching, learning and academic support through the increased accessibility and interactivity of information resources. The results thus indicate that emerging technologies contribute to modernizing and improving library services and user experience in academic institutions.

Strengthen collaboration and academic engagement

The theme states that emerging technologies foster stronger collaborations and communications between librarians, faculty members, institutions and external organizations. Participants reported collaboration through faculty coordination, inter-library sharing, and agency partnerships, as exemplified in statements such as *Nag collab kami with faculty and program heads” (IP5) and “Collaboration with agencies… MOA and inter-library sharing” (IP7).*

> Emerging technologies promote collaboration between librarians and faculty, thereby increasing academic engagement among users. IDI_IP5; IDI_IP7.

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The findings indicate that digital technologies improve academic engagement, knowledge sharing and collaboration between institutions which in turn improves library services and academic support systems. This observation aligns with the work of Vlase et al. (2023), who noted that cooperation and knowledge sharing are fundamental functions of contemporary libraries in academic communities. Likewise, Eroglu et al. (2025) stated that collaborations and institutional cooperation contribute to the implementation of library services and technological innovations. LealFilho et al. (2025) also reported that collaboration among librarians, faculty and external stakeholders improves academic engagement, resource sharing and research support in higher education institutions. In summary, the results show that emerging technologies enhance collaboration networks and encourage active academic engagement of library stakeholders.

Innovation and professional growth opportunities

Emerging technologies support innovation, strategic planning, and professional development among librarians, as revealed in the theme. Participants stressed that technology enables more data-driven decision-making, better planning and improved service innovation, as demonstrated in statements such as

> *Strategic decision-making is more data-driven" and "More time for planning and community engagement" (IP6)*
>
> Digital technologies support data-driven decision-making and encourage innovation in library services and operations. IDI_IP6

These findings indicate that technology integration not only enhances library operations but also provides librarians with opportunities to develop their professional competencies and broaden their institutional roles. This finding is in agreement with the work of Nakaziba et al. (2024) which highlights that digital transformation drives librarians to develop advanced technological and leadership competencies. Similarly, Isiaka et al. (2024) said innovation and continuous learning are crucial for librarians to adapt to the rapidly changing digital environments. Aslam et al. (2025) further pointed out that the adoption of technology provides librarians opportunities for professional development, innovation in services, and increased engagement in academic institutions. The findings, thus, show that emerging technologies are highly contributory to innovation, leadership development, and the changing professional roles of librarians.

Underutilized potential due to limited awareness

The theme points out that digital technologies and resources are available in libraries but the benefits of these are not being fully utilized because of the ignorance of many users about their existence and functions. Participants voiced concerns about poor dissemination and limited awareness, illustrated by comments such as:

> *Wala na disseminate… dili sila aware" and "Dili nila magamit kay wala sila kabalo" (IP1)*
>
> Lack of effective dissemination and low awareness among students and users limit the utilization of available technologies and digital resources. IDI_IP1

The results indicate that the use and effectiveness of existing technologies and digital services are hindered by inadequate dissemination strategies and a lack of user orientation. This finding is in line with Mutuma (2024), who identifies awareness and user engagement as key factors in the successful use of digital library resources. Similarly, Santarius et al. (2023) note that digital systems are less effective when users are not sufficiently informed about the technologies and services available. Moreover, Almusaed et al. (2025) found that user participation and the optimal dissemination strategy are essential for maximizing the use and impact of electronic resources in academic settings. Overall, the findings point to the need for stronger dissemination programs, orientations, and promotional strategies to capitalize on the opportunities and benefits offered by emerging technologies in academic libraries.

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Perspectives on the Future of Academic Libraries and Technology Adoption

Table 5 presents five key themes regarding the challenges librarians face when using technology and the solutions that support it. These are: balanced integration of traditional and digital practices, continuous learning and adaptability, need for institutional support, training, and resources, leadership, innovation, and strategic vision, and future-oriented transformation of academic libraries.

Table 5. *Perspectives on the future of academic libraries, including the meaning of a hybrid model, lessons learned, and recommendations for strengthening technology adoption*

Theme	Core Ideas	Illustrative Quotes
Balanced Integration of Traditional and Digital Practices	Emphasizes the need to balance traditional and digital library services	Balance lang gihapon… dili mag dependent sa AI (IP1)
	Avoids overdependence on emerging technologies such as AI	Not all users have access… practice parin ang traditional (IP2)
	Recognizes limitations of digital tools in accuracy and accessibility	Dili kaayu ta mag dwell sa AI… gamiton pero with caution (IP3)
Continuous Learning and Adaptability as Essential Competencies	Highlights the importance of lifelong learning among librarians	Kailangan mo talagang i-embrace (IP7)
	Encourages adaptability to emerging technologies	Continuous learning and adaptability (IP6)
	Supports professional growth through technology use	Natuto gumamit ng applications… essential na siya (IP7)
Need for Institutional Support, Training, and Resources	Requires increased funding and budget allocation	Increase funding… support and training (IP6)
	Emphasizes need for training, workshops, and technical support	Training and workshops very important (IP5)
	Encourages collaboration and partnerships for resource sharing	Collaboration with other libraries for sharing ideas (IP5)
Leadership, Innovation, and Strategic Vision	Requires proactive and visionary leadership	Head should be optimistic and futuristic (IP7)
	Emphasizes strategic planning and long-term vision	Kailangan mag assert… mag innovate (IP4)
	Encourages innovation and assertiveness in technology adoption	Envision what your library will be in 5–10 years (IP7)

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Future-Oriented Academic Libraries	Transformation of	Libraries will evolve into technology-driven and hybrid environments	Mas high-tech… faster access (IP1)
		Increased integration of digital, AI, and advanced systems	Dynamic technology spaces… empower learning (IP5)
		Enhances relevance, accessibility, and user engagement	Technology-driven services… more relevant (IP7)

Balanced integration of traditional and digital practices

The theme emphasizes the need for a balance between traditional library services and emerging digital technologies in academic libraries. Participants emphasized the need for digital systems and AI tools to be used alongside traditional methods, citing the unequal access to technology among users and the potential limitations in accuracy and reliability of digital tools. This is expressed in language such as:

> *Balance lang gihapon… dili mag dependent sa AI" (IP1) and "Not all users have access… practice parin ang traditional" (IP2)*
>
> Academic libraries emphasize the need to balance traditional and digital library services while avoiding overdependence on emerging technologies such as AI. IDI_IP1; IDI_IP2

The results suggest that academic libraries are embracing a hybrid model that leverages the strengths of traditional and technology-driven services to achieve inclusivity, accessibility, and balanced service delivery. This result is consistent with Hossain's (2025) research, which indicates that libraries must adopt new technologies while maintaining librarians' human-centered and teaching roles.

Similarly, Yudov (2023) argued that digital transformation should not replace traditional information services entirely, but rather improve them. Hybrid library models are flexible and inclusive by integrating physical and digital services to cater to diverse user needs and technological constraints, according to Panda et al. (2023). In conclusion, the findings reveal that the future of academic libraries is a balanced, cautious integration of traditional and emerging technologies.

Continuous learning and adaptability

Continuously learning and adapting as core competencies. Librarians must continuously update their knowledge and skills to remain relevant in rapidly changing technological environments. Participants underscored the importance of embracing technological changes and developing adaptability as reflected in statements such as

> *Continuous learning and adaptability" (IP6) and "Natuto gumamit ng applications… essential na siya" (IP7)*
>
> Adaptability to emerging technologies supports librarians' professional growth and continuous development in evolving digital environments. IDI_IP6; IDI_IP7

These findings mean that librarians must engage in lifelong learning and develop their technological competence in order to manage digital services efficiently and meet the changing needs of users. This is consistent with the findings of Shahzad et al. (2023) that librarians require ongoing professional development to enhance digital competencies and information technology skills. Likewise, Isiaka et al. (2024) stated that adaptability and lifelong learning are vital competencies for librarians in the context of digital transformation in higher education institutions. In addition, Oyedokun (2025) further emphasized that continuous learning equips librarians to innovate, stay relevant, and effectively support changing academic and technological environments.

Thus, the results show that adaptability and lifelong learning are basic prerequisites to maintain effective library services in the digital era.

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Need for institutional support, training, and resources

The theme emphasizes that successful adoption of technology in academic libraries requires adequate funding, continuous training opportunities, technical support, and collaborative partnerships. Participants stressed the importance of financial and institutional support, as shown in statements like:

> *Increase funding… support and training" (IP6) and "Training and workshops very important" (IP5)*
>
> Effective technology adoption requires increased funding and budget allocation alongside continuous training, workshops, and technical support. IDI_IP6; IDI_IP5

This suggests that institutional commitment and resource allocation are important factors in the sustainability and effectiveness of digital transformation efforts in libraries. This is consistent with the work of Aziz et al. (2023) who explained that strategic institutional investment and long-term support are needed for sustainable technology integration. Likewise, Rahman et al. (2025) stressed that training programs, organizational support, and collaborative initiatives are crucial for the successful adoption of technological innovations in libraries.

Also, Olubiyo et al. (2022) pointed out that partnerships and collaborative networks promote resource sharing, professional support and innovation in academic library settings. In conclusion, the results suggest that institutional support systems, funding, and collaboration are important in improving the adoption of technology and digital transformation in academic libraries.

Leadership, innovation, and strategic vision

The theme underscores the need for proactive leadership and long-term planning to advance the future development of academic libraries. Participants emphasized the need for optimistic, innovative, and visionary leadership, as reflected in quotes like:

> *Head should be optimistic and futuristic" (IP7) and "Kailangan mag assert… mag innovate" (IP4).*
>
> The future development of academic libraries requires proactive, visionary leadership, supported by strategic planning and long-term vision. IDI_IP7; IDI_IP4

The findings suggest that successful leadership is vital to cultivating innovation, strategic decision-making, and successful technology integration in academic institutions. This finding aligns with those of Atanda et al. (2025), who argued that leadership and strategic planning are key to addressing technological change and organizational development in libraries. Similarly, Mohammed et al. (2022) noted that visionary leadership has a role in promoting innovation and sustainable implementation of emerging technologies in library systems. Rahmanova (2025) further stated that strategic leadership enables libraries to predict future trends, enhance digital infrastructures and stay relevant in changing educational environments. Thus, the results suggest that innovation-oriented leadership and long-term strategic vision shape the future direction of academic libraries.

Future-oriented transformation of academic libraries

The theme entails a shift towards more technology-based, dynamic, and hybrid learning environments, with greater integration of digital systems, AI technologies, and advanced information services. Some participants imagined future libraries, suggesting that technology will continue to reshape library functions and user engagement:

> *Mas high-tech… faster access" (IP1) and "Dynamic technology spaces… empower learning" (IP5)*
>
> Academic libraries are expected to evolve into technology-driven, hybrid environments characterized by greater integration of digital, AI, and advanced systems. IDI_IP1; IDI_IP6

The results suggest that emerging technologies are viewed as significant tools for enhancing accessibility, relevance, efficiency and academic engagement in modern libraries. This finding is supported by the work of Halder (2025), who emphasizes that digital transformation expands the role of libraries as accessible, technology-

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enabled knowledge spaces. Similarly, Meesad et al. (2024) found that academic libraries are moving towards technology and user-driven service models to meet changing educational needs. Additionally, hybrid and digitally integrated libraries enhance access, promote user engagement, and boost institutional relevance in the changing higher education landscape (Lee, 2025). Overall, the results indicate that the future of academic libraries is likely to be characterized by continued technological innovation, hybrid service delivery, and increased digital user engagement.

Implication for Practice

The findings of this study have important implications for practice in academic librarianship and information management, especially for the integration of emerging technologies within academic libraries. The study points out that academic libraries are currently undergoing a gradual shift from traditional library systems to more technology-based, hybrid service models. This means librarians and library administrators need to strengthen digital transformation initiatives by gradually expanding digital collections, subscription databases, automation systems, cloud repositories, and AI-supported services to improve access to information, support research, and enhance institutional efficiency.

In practice, libraries need to adopt sustainable and flexible digital strategies that balance traditional and digital services to accommodate users with varying technological access and competencies. The findings further suggest that academic librarians' professional roles are becoming more diverse and technology-driven. Librarians are no longer just resource managers; they are now being called upon to serve as technology facilitators, digital resource managers, trainers, planners, and institutional leaders.

This implies that academic institutions should reconsider library practice standards by incorporating digital competencies, leadership skills, and technological expertise into librarians' professional roles and performance expectations. Library administrators may also need to change operational structures to support librarians with adequate staffing, clearer task distribution, and manageable workloads to meet the growing institutional pressures associated with accreditation, compliance, and digital transformation.

The study also suggests that institutional support remains an important factor in the successful implementation of emerging technologies in academic libraries. Budget constraints, inadequate technological infrastructure, unreliable internet connectivity, and lack of technical support continue to impede the sustainability of digital services. Therefore, academic institutions and policymakers should focus on strategic funding allocation for digital infrastructure, subscription databases, automation systems, and the maintenance of technological resources. Practical implementation could involve developing long-term technology investment plans, strengthening relationships with external agencies, and making the most of open-access resources and collaborative networks to complement limited institutional resources.

Another significant implication for practice is the need for continuous training, orientation, and capacity-building programs for both librarians and users. The results show that many technologies are underused because of poor dissemination, lack of awareness and limited digital literacy among users and staff. This implies that academic libraries should institutionalize regular training workshops, digital literacy programs, user orientations, and professional development activities to enhance technological competencies and improve utilization of digital services. In practice, libraries should develop structured dissemination and promotional strategies to inform students, faculty, and staff of technologies, digital collections, and online services available to them.

The findings also suggest that emerging technologies provide opportunities to enhance user experience, collaboration, and academic engagement in academic institutions. Technology integration enables faster information retrieval, remote access to resources, enhanced teaching and learning support, and increased collaboration among librarians, faculty, and external institutions.

Thus, academic libraries should improve collaborative practices such as inter-library sharing, institutional partnerships, faculty coordination, and digital knowledge-sharing initiatives to make the most of the educational and research benefits of emerging technologies. Finally, the study implies that the future practice of academic librarianship will increasingly rely on adaptability, innovation, and strategic leadership.

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Academic libraries are expected to become dynamic, hybrid, and technology-driven learning environments, requiring librarians to constantly adapt to changing technological trends and user demands. This indicates that library administrators should encourage innovative management practices, long-term strategic planning, and proactive leadership approaches that support sustainable digital transformation. Ultimately, the findings emphasize the necessity for academic libraries to be more resilient, technologically responsive, and user-centered to be relevant in the fast-changing digital information environment.

Implication for Future Research

The findings of this study offer several implications for future research on emerging technologies in academic libraries, particularly in digital transformation, technology adoption, and evolving librarian roles. Future research could expand the scope of inquiry to yield broader, more comprehensive findings.

This research could employ different research designs, participants, and data-collection methods, since this study focused mainly on librarians lived experiences, reactions, and perspectives on emerging technologies. Future researchers can undertake quantitative research to assess the degree of technology adoption, digital readiness, user satisfaction, technological competencies, and the effectiveness of digital library services across academic institutions. Surveys with larger populations of librarians, faculty, students, and administrators may provide statistical evidence on the relationship between technology integration and variables such as service efficiency, research productivity, user engagement, and institutional performance. Correlational or causal-comparative studies can also be employed to determine the impact of funding, infrastructure, training, and leadership support on the successful implementation of technology in academic libraries.

In addition, future studies can use mixed-methods research designs to integrate numerical data with detailed qualitative insights. Such approaches may offer a more holistic perspective on how emerging technologies impact library operations, user experiences, organizational culture, and institutional development. Researchers may also explore comparative studies between public and private academic institutions, urban and rural libraries, or technologically advanced and resource-constrained institutions to identify differences in technology adoption practices, challenges, and outcomes. The study also highlights the need for future studies with broader participant groups beyond librarians. Future research can involve students, faculty members, information technology personnel, administrators, policymakers, and external stakeholders to study their perceptions, experiences, and expectations of digital library services and emerging technologies. Inclusion of a diverse group of participants might offer a more comprehensive understanding of how technological innovations impact the academic community as a whole and may help to identify gaps between service provision and user needs.

Future research can also use other means of data collection, such as online surveys, focus group discussions, case studies, observation, document analysis, and longitudinal studies. Longitudinal research may be especially helpful in studying the development of technology integration over time and the response of academic libraries to ongoing technological changes and institutional needs. Case studies of highly digitized academic libraries may also serve as best practices, innovative strategies, and models for other institutions to adopt. Future research could also explore specific emerging technologies such as artificial intelligence, cloud-based systems, virtual reference services, data analytics, digital repositories, automation systems, and online public access catalogs (OPACs) to investigate their effectiveness, sustainability, ethical implications, and impact on library services and user engagement. Other topics of interest may include digital inclusion, cybersecurity, information literacy, and academic libraries' readiness for the next technological disruption.

CONCLUSION

Conducting this study enabled the researcher to gain a better understanding of what academic librarians experience as they adapt to the continual evolution of library services in the digital age. The findings indicate that new technologies present substantial opportunities for enhancing access to information, improving library operations and fostering academic engagement, but their successful deployment hinges on institutional backing, technological readiness, financial resources and ongoing professional development.

The researcher found that digital transformation in academic libraries is not just about acquiring advanced technologies but also about ensuring that librarians, users and institutions are prepared for the changing needs of technology-driven learning environments. The study also highlighted the resilience, flexibility, and commitment of academic librarians in the face of limited resources, increasing workloads, accreditation requirements, and rapid technological change.

The researcher gained a deeper understanding of librarians as not just information gatekeepers, but as educators, technology enablers, innovators and institutional leaders who are critical to the continued functioning of academic support systems through the experiences of the participants. The researcher found that successful technology integration requires collaboration, creativity, strategic planning, and a strong commitment to lifelong learning and continuous improvement.

Additionally, the study helped the researcher understand that the future of academic libraries lies in integrating traditional and digital practices in a balanced way. As new technologies change how libraries operate and how users interact with them, the human touch, guidance, and professional knowledge will remain key components of good library service. The researcher also acknowledged the importance of awareness programs, dissemination strategies, and user education as critical to maximizing the benefits of digital technologies and ensuring full utilization of available resources by the academic community.

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