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# Digital Technology Utilization, Library Service Quality and User Engagement in Developing Philippine Academic Library

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**Abstract: The research examined the relationship between digital technology utilization, library service quality and user engagement in the developing Philippine Academic Library. This is grounded in the TAM model and the SERVQUAL framework, sought to address the gap in understanding the digital adoption in provincial academic institutions. Data was gathered from 231 students at Pilar Community College using a descriptive correlational research design and a structured and reliable survey questionnaire. To ensure year levels are properly represented, respondents were selected using a proportional stratified random sampling technique. The questionnaire had an excellent reliability, with Cronbach's alpha coefficients for all variables at 0.90. The results showed high levels of digital technology usage (mean 3.01), library service quality (mean = 3.10), and engagement of user (mean = 3.02). A Pearson correlation analysis showed a strong positive and statistically significant relationship between the use of digital technology and library service quality ($r = 0.713$, $p < 0.05$), as well as between the use of digital technology and engagement of user ($r = 0.713$, $p < 0.05$). It is suggested that greater use of digital technology is linked to a better perceived quality of library services and to higher levels of user engagement. The findings deliver evidence supporting planned investments in digital services to promote higher education institutions. This also shows the need of keeping up with digital developments, increasing the availability of digital resources, and upgrading technical support in order to promote efficient and user centered library services. Future studies could involve more academic institutions and different factors to attain more thorough findings.**

***Keywords:*** *Digital Technology Utilization; Library Service Quality; User Engagement; Technology Acceptance Model; SERVQUAL Framework; Philippine Higher Education.*

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## I. INTRODUCTION

The rapid progress of digital technologies has changed the way information is created, accessed and distributed worldwide. Libraries have moved from being a simple storage of printed materials to being a dynamic digital environment that offers flexible, remote access to information resources. By using technologies such as online public access catalogs (OPACs), electronic database, institutional repositories, and virtual reference services, libraries are gradually introducing user-focused, technology-based systems to meet users' increasing demand for convenient and efficient access to information (Verma & Dwivedi, 2023)[1]. Through digital transformation it enhances accessibility, operational efficiency, and overall quality of the services that are offered to users (Elaiess, 2023)[2]. The IFLA Trend Report (2023) also highlights the continued role of libraries in promoting inclusive and equitable access to information through the use of digital technologies. It has therefore become necessary for libraries to keep up a high standard of service and to improve user engagement if they are to deliver effective library services in the digital age (Abdin et al., 2023)[3]. Previous studies have also demonstrated that digital library services result in a greater user satisfaction when the quality of the system, accessibility and usability are properly managed (Lu & Lin, 2024)[4]. Furthermore, digital technologies boost user engagement by encouraging effective participation and interaction through online and interactive library platforms (Qiao, 2026)[5]. In the Philippines, academic libraries are also incorporating digital resources and ICT-based services to support teaching, learning and research. Yet there is considerable variation in the extent to which digital technology is adopted across institutions due to differences in funding technological readiness, infrastructure, and technical expertise (Datucali & Diaz, 2024)[6]. Institutions that are still in the process of development continue to face several

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difficulties, such as a lack of technological equipment, poor digital infrastructure, staffing limitations and problems related to sustainability of digital services (Llagas & Isip, 2023)[7]. Moreover, limited financial resources and a lack of technical training among library personnel also affect the effective implementation of digital technologies (Malabanan, 2025)[8]. Nevertheless, Philippine academic libraries continue to adopt ICT-based solutions and new technologies to improve service delivery, increase access to information resources, and boost user engagement, especially in higher education institutions, where digital access is becoming increasingly important for academic learning and research (Dharmaraj, 2024)[9].

Although previous studies showed the benefit of digital technologies in academic libraries, limited evidence exists regarding how digital technology utilization relates simultaneously to library service quality and user engagement within Philippine higher education institutions. Existing studies focused on universities with advanced technological capabilities, leaving smaller and developing institutions underrepresented in terms of literature. In these settings,institutions often continue to use manual or partially automated systems, reflecting a transitional phase of digital development (Mansibang & Luciano, 2025)[10]. This research gap is particularly noticeable in local settings such as Sorsogon, where digital initiatives are beginning to emerge but have not been systematically evaluated. There is, therefore, a need for context-specific research to understand and examine how digital technologies affect library service quality particularly system usability, accessibility, and reliability, as well as user engagement,including how users access , interact with and respond to library services(Paul et al., 2024)[11].

This study attempts to fill this gap by looking into the relationship between digital technology utilization, library service quality, and user engagement at Pilar Community College in Sorsogon, Philippines. Guided by the Technology Acceptance Model (TAM) and the SERVQUAL framework, the study contributes to the body of knowledge on digital library environments in developing academic institutions. In this study, the term digital technologies includes both existing and emerging digital tools, including basic digital access and partially implemented systems, thereby providing a more inclusive perspective of developing academic libraries. Specifically, the study evaluates the level of digital technology utilization, library service quality, and user engagement, and examines the relationship among these variables.

➢ *Framework*

This study is based on the Technology Acceptance Model (TAM) by (Davis, Bargozzi & Warshaw, 1989)[12] and the SERVQUAL Model (Parasuraman, Zeithaml & Berry, 1988)[13], together the two models provide the basis for the examination of the use of digital technology, the quality of library services and user engagement. The TAM model suggests that people are more likely to adopt and continue to using digital technologies if they see them as useful and easy to use. At the same time, in Pilar Community College (PiCC), this theory explains students' use of digital library resources, including electronic databases, digital reference services, and online materials to show how their usage affects their engagement with library services. Together with TAM, the SERVQUAL Model assesses users' perceptions on service quality by means of the dimensions of reliability, responsiveness, assurance, empathy, and the tangibles, these having been adjusted for use in digital library environments to evaluate accessibility, system reliability, usability, and the responsiveness of digital library services (Masinde et al., 2025)[14].

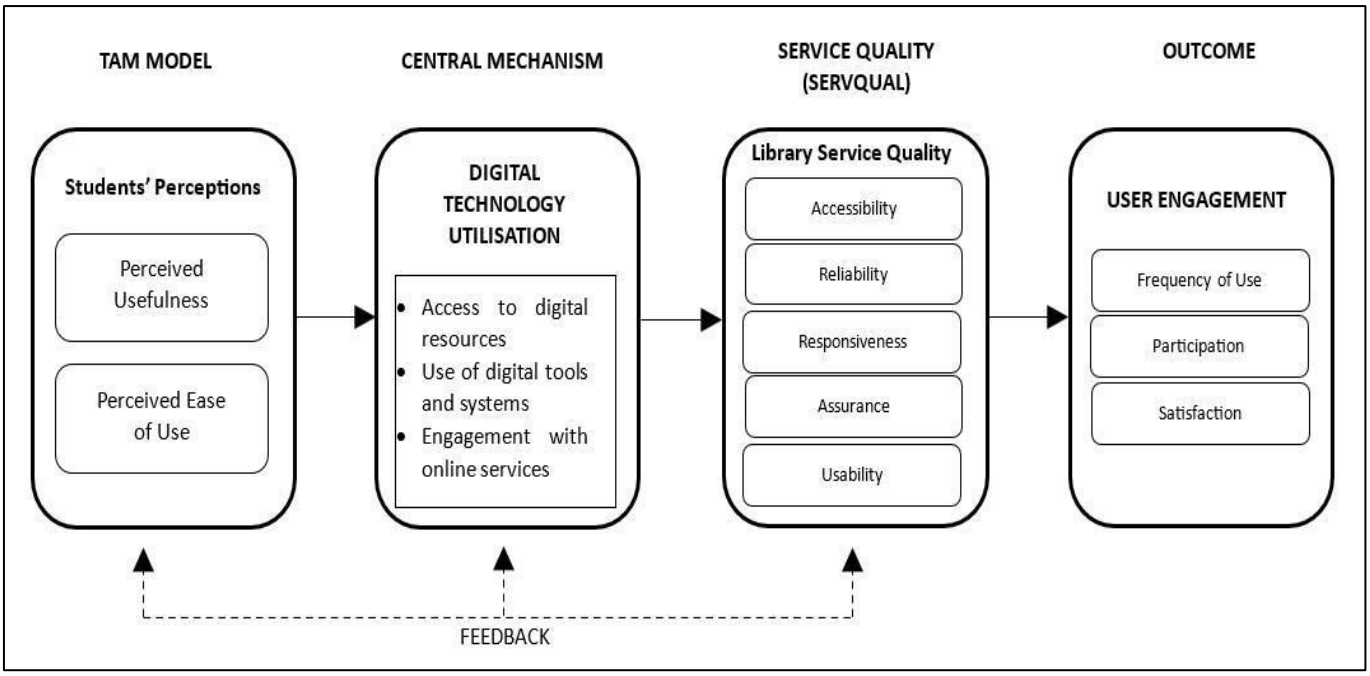



Fig 1 The Digital Library Engagement and Service Quality (DLESQ) Model.

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Based on these theories, the study introduces the Digital Library Engagement and Service Quality (DLESQ) Model, which views the use of digital technology as the key mechanism linking technology acceptance, library service quality, and use engagement. The model shows that the greater use of digital library technologies helps to improve the users' perceptions of the quality of the services offered and results in higher levels of engagement by encouraging more frequent use, active participation, and greater satisfaction. This DLESQ model is different from other existing frameworks in such a way that it treats the variables as separate issues, through integrating the two models into one framework. It also includes a feedback mechanism showing how positive experiences with digital library services lead to a continued use. Furthermore, this approach also explains the relationship between digital technology use, the quality of library services, and user engagement in the case of a developing academic library in the province.

Based on the theoretical framework, these following hypotheses were formulated:

- H1: There is a significant relationship between digital technology utilization and library service quality.
- H2: There is a significant relationship between the use of digital technology and user engagement.

## II. METHODS

The study used a quantitative descriptive-correlational methods in order to examine the relationships among the use of digital technology, the quality of library services, and user engagement at Pilar Community College (PiCC) in Sorsogon, Philippines, a developing higher education institution that offers the Bachelor of Technology and Livelihood Education degree in Information and Communication Technology. The participants were first-year, second-year, and third-year students who were enrolled during the second semester of the 2025-2026 academic year. A sample of 231 students was chosen from a total population of 545 by means of proportionate stratified random sampling and Slovin's formula with a 5% margin of error, thus making sure that the researchers gathered the data through a standard online questionnaire. This questionnaire was administered through google forms after having obtained institutional approval and securing informed consent. Participants could choose to take part in the study voluntarily, and it was guaranteed that their answers would stay confidential, anonymous and be handled in an ethical manner.

The Digital Library Engagement and Service Quality (DLESQ) Model was developed by combining and adapting aspects of the Technology Acceptance Model (TAM) and the SERVQUAL Model, and previous research concerning digital library use and user engagement. The questionnaire is comprised of 53 questions, covering demographic questions and four-point Likert scale statements that assesses the use of digital technology in relation to the accessibility of digital resources, technology services, electronic tools and the quality of library services in terms of accessibility, reliability, responsiveness and usability, as well as user engagement including the frequency of use, participation and satisfaction. The pilot test was carried out on the students who have used the library. The pilot test showed high internal consistency, the Cronbach's alpha values for the three main constructs being 0.923, 0.954 and 0.949 respectively. The levels of the different study variables were determined using descriptive statistics (weighted means). The relationships between digital technology usage, library service quality and user engagement were studied using the Pearson product-moment correlation coefficient at 0.05 level of significance.

## III. RESULTS

Table 1 Level of Digital Technology Utilization

| Indicator | Mean | Interpretation |
|---|---|---|
| Accessibility of Digital Resources | 3.09 | High |
| Availability of Technology Services | 2.94 | High |
| Use of Digital Tools | 2.99 | High |
| **Overall Mean** | **3.01** | **High** |

The findings show that the general degree of use of digital technology by the respondents was high (mean = 3.01). Accessibility of Digital Resources had the highest (mean = 3.09), then Use of Digital tools (mean = 2.99), and Availability of Technology Services had the lowest (mean = 2.94).

Table 2 Level of Library Service Quality

| Indicator | Mean | Interpretation |
|---|---|---|
| Accessibility | 3.07 | High |
| Reliability | 3.02 | High |
| Responsiveness | 3.20 | High |
| Usability | 3.12 | High |
| **Overall Mean** | **3.10** | **High** |

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The results show that the general level of library services was high (mean = 3.10); of the various dimensions examined, responsiveness had the highest mean (mean = 3.20), then usability with (mean = 3.12) and accessibility (mean = 3.07) and reliability having the lowest mean (mean = 3.02).

Table 3 Level of User Engagement

| Indicator | Mean | Interpretation |
|---|---|---|
| Frequency of Use | 2.97 | High |
| Participation | 2.99 | High |
| User Satisfaction | 3.09 | High |
| **Overall Mean** | **3.02** | **High** |

The findings indicate that respondents exhibited a high level of user engagement, with an average of 3.02; user satisfaction had the highest (mean = 3.09), followed by participation with (mean = 2.99, while frequency of use had the lowest (mean = 2.97).

Table 4 Relationship Between Digital Technology Utilization, Library Service Quality and User Engagement

| Variables Compared | r-value | p-value | Interpretation | Decision |
|---|---|---|---|---|
| Digital Technology Utilisation & Service Quality | 0.780 | 0.000 | Strong Positive Relationship | Significant |
| Digital Technology Utilisation and User Engagement | 0.713 | 0.000 | Strong Positive Relationship | Significant |

A Parson correlation analysis showed a strong positive and statistically significant association between the use of digital technology ($r = 0.780$, $p < 0.05$). It also showed a strong positive and statistically significant association between digital technology use and user engagement ($r = 0.713$, $p < 0.05$).

## IV. DISCUSSIONS

➢ *Digital Technology Utilization*

The high level of digital technology utilization indicates that respondents have generally incorporated digital library resources into their academic work. The highest mean in the Accessibility of Digital Resources indicates that the library has digital resources in which the students can find and access easily, which shows that electronic resources are a significant part of the teaching and learning process. However, the result contradicts the Availability of Technology Services, which got the lowest mean score which suggests that despite the available resources, access to technology is still limited because of factors such as internet connectivity, digital devices, and institutional ICT infrastructure. Although these limitations have not reduced overall student usage, they may affect students' access to digital services in the library.

The results support the Technology Acceptance Model (TAM) which suggests that technology that is perceived as useful and easy to use is more likely to be adopted (Davies et.al. 1989)[12]. In academic libraries, easily accessible digital resources help promote technology adoption, even with infrastructure limitations. This is consistent with the findings of Tano (2024)[16] and Dharmaraj (2024)[9], who found that academic libraries in the Philippines continue to expand their digital services despite challenges related to their technological infrastructure. Taken together, these findings indicate that improving the ICT infrastructures and enhancing access to digital technologies would further increase students use of digital library services.

➢ *Library Service Quality*

The high level of perceived library service quality indicates that the respondents had a positive view of the library's services. Responsiveness got the highest mean, indicating that timely help from library staff remains important, even in digital library environments. Students often require assistance in locating the electronic resources of the library, searching or navigating online databases and addressing technical issues. As a result, responsive library staff make a significant difference to users' positive experience and their confidence in digital library services.

Reliability was also rated high but had the lowest mean among all service variables provided. This suggests inconsistencies when accessing digital services, which may be caused by unstable internet connectivity, system maintenance, or the limited technologies available in the library. These operational difficulties are typical in academic libraries with limited financial and technological resources. So, it is therefore important to ensure that reliable digital services are provided to maintain the reliance and confidence of library users. The results are consistent with the SERVQUAL framework (Parasuraman et al., 1988)[13], a framework that sees responsiveness, reliability, accessibility, and usability as key aspects of service quality; which also supports the findings of Lu and Lin (2024)[4] and Pathak and Pal (2024)[17], who showed that responsiveness and easy to use digital services greatly improve users' perceptions of the quality of library services.. Overall, the findings highlight the importance of continuous investment in both technological infrastructure and responsive user support to improve service quality.

➢ *User Engagement*

The results show a high degree of user participation with the digital library services. The mean score for user satisfaction was the highest, which suggests that the respondents generally regarded the quality and usefulness of the library's digital resources and services as positively. However, the level of participation and frequency of use were

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relatively low ratings, suggesting that students might have difficulty in accessing or navigating these resources or use digital library resources for academic work rather than for their usual learning activities. This trend may also indicate that students prefer free online information sources and general search engines for their everyday information needs and they mainly use library resources for their coursework and research.

The results support the Technology Acceptance Model that perceived usefulness leads to favorable attitudes toward the adoption and continuous use of technology (Davis et al., 1989)[12]. Yet, positive perceptions alone may not be sufficient to ensure regular interaction with library services. The findings were consistent with the reports of Qiao (2026)[5] and Paul et al. (2024)[11] who noted that high user satisfaction does not always result in continued engagement. The results suggest that academic libraries should integrate digital resources with effective engagement strategies, such as activities or programs related to digital literacy, online orientations, lecture series, and practical or hands-on learning activities, to promote more consistent use of digital library services.

- *Relationship between Digital Technology Utilization and Library Service Quality*

The strong positive relationship between digital technology utilization and library service quality suggests that students who use digital technology in the library more frequently tend to rate library services more favorably. The more frequently students use digital library platforms, the more familiar they become with the available services, the fewer barriers they face to access, and the more positive their perceptions of accessibility, responsiveness, usability, and overall service effectiveness. Since they make greater use of these services, students are also able to experience a wider variety of digital services, which in turn reinforces their positive views of library quality.

The findings support both the Technology Acceptance Model and the SERVQUAL framework, indicating that favorable experiences with digital technologies lead to more positive evaluations of library services. These are also consistent with the results of Verma and Dwivedi (2023)[1], Lu and Lin (2024)[4], Pathak and Pal (2024)[17], and Esposo-Betan and Fresnido (2022)[18], who also found that efficient digital library services improve users' perception of service quality. The results highlight the importance of continuing to improve digital library services and improve users' perceptions of service quality. The results highlight the importance of continuing to improve digital infrastructures, system reliability, and user-oriented digital services to strengthen overall library performance.

- *Relationship between Digital Technology Utilization and User Engagement*

The strong positive correlation between digital technology use and user engagement indicates that the more digital technologies people use, the more involved they become in library services and the higher their satisfaction. The frequent use of digital resources enables students to become more accustomed to the library's digital environment and is thereby increasing their confidence in locating information and promoting greater engagement with the available services. Also the increased familiarity with digital platforms may help reduce technological barriers that otherwise discourage participation among library users.

These results also support the Technology Acceptance Model, reflecting that the positive experiences with digital technologies of library users lead to continued engagement with library services. Mensah and Khan (2024)[19], Qiao (2026)[5], Abdin et al. (2023)[3], Gupta (2021)[20], Tagarda et al. (2025)[21], and Lasog (2021)[22], all have emphasised the importance of digital technologies in enhancing user engagement in academic libraries. The results suggest that the expansion of digital services should be accompanied by measures to motivate students to explore and regularly utilize these digital resources provided thus fostering sustained engagement with academic library services.

## V. CONCLUSION

The study examined the relationships between the use of digital technology, the quality of library services, and user engagement at Pilar Community College. The results revealed that the respondents' level of digital technology utilization is high, the perceived library service quality and user engagement among the respondents. In addition, the Pearson correlation analysis showed that there is a positive significant relationship between the use of digital technology and both the quality of library services and user engagement.

The study was supported by the Technology Acceptance Model (TAM) and the SERVQUAL framework which helps in understanding technology utilization, the perceived service quality of library services and user engagement within an academic library environment. In a general sense, the study highlights the important role of digital technologies in improving the library experiences of the students and in supporting teaching, learning and research within higher education institutions.

## VI. PRACTICAL IMPLICATIONS

For academic libraries and higher education institutions, the findings have several practical implications. For library administrators, the results may help to acknowledge the importance of strengthening digital infrastructure, extending access to electronic resources, and also in enhancing the reliability of digital library systems to improve service quality and user engagement. Higher education institutions must promote more effective use of library resources by integrating digital library services into their digital literacy programs. Also it may provide empirical evidence to the Commission on Higher Education (CHED) and others who are responsible for setting higher educational policies in support of the continued investment in ICT infrastructure, in the development or improvement of libraries in a digital age, and in the professional development of librarians specifically in improving and acquiring technological skills. The result may also assist in formulating

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institutional policies that are aimed at ensuring equal access to high quality digital library services among higher education institutions.

## VII. LIMITATIONS

The current study has some limitations that need to be considered in the interpretation of the findings. To begin with, the research took place at a single local higher education institution which may limit how general the results may apply to other academic library settings. Second, the study used self-reported questionnaire data, which may indicate that relying on it introduces the possibility of response bias. The third limitation is that the cross sectional design only provides a snapshot of respondents' perception at one moment which makes it challenging to draw any conclusions about causation. And finally, the correlational analysis while it revealed relationships among variables, it did not establish direct or indirect causal links.

## RECOMMENDATIONS

Future research may make use of Structural Equation Modeling to investigate the explicit and implicit relationships between the use of digital technology, the quality of library services, and user engagement. Also, to make the findings more broadly relevant, expanding the scope to include a diverse range of participants from the private and public education institutions. Morover, a combination of in-depth interviews and focus groups with quantitative surveys may allow for a more complete and comprehensive understanding of users' experiences with digital library services. Finally, to track the changes in the utilization of digital technology, the quality of library service and user engagement, a longitudinal study may be conducted as academic libraries continue to expand and improve their digital services.

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Dr. Myla P. Bernat earned her Doctor of Philosophy in Educational Management from the University of Perpetual Help System Laguna, Philippines. She currently serves as Assistant Chief Librarian at the University Library of UPHSL. Her research interests include library laws and their application, reference and library services and the application

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of information technology in library operation. She contributed to the scholarly review and validation of the manuscript, provided recommendations on its content and methodology, assisted in interpreting the findings and refining the discussion and approved the final manuscript for submission.

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