

User Experience in Libraries: A Comparative Analysis of Spaces, Services, and Digital Platforms Across Library Sectors

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Abstract

User experience (UX) has emerged as a critical lens for evaluating how library users engage with physical spaces, digital systems, and service environments. This study examined UX across school, academic, and public libraries in the Philippines and Qatar using a descriptive-comparative and predictive-correlational design with 188 library users. Physical User Experience (PUE), Digital User Experience (DUE), and Service-Oriented User Experience (SOUE) were assessed alongside overall library satisfaction and comparative library experience. All three dimensions were rated Very Positive, with PUE receiving the highest composite mean. One-way ANOVA confirmed statistically significant differences across library sectors in all UX dimensions ($p < .001$), with large effect sizes across all comparisons ($\eta^2 = .278-.532$). Multiple linear regression revealed that SOUE was the strongest predictor of both overall library satisfaction and comparative library experience, followed by DUE; PUE significantly predicted overall satisfaction but not comparative experience. These findings resulted in the development of the Library User Experience Enhancement Framework (LUXEF), an evidence-based model designed to guide libraries in strengthening service excellence, digital infrastructure, physical environments, and continuous user experience assessment.

Keywords: User experience; Library satisfaction; Physical user experience; Digital user experience; Service-oriented experience; LUXEF

1. INTRODUCTION

Libraries remain among the most consistently used resources for learning, inquiry, and community engagement. From being conceived mainly as physical repositories of books, libraries have been reshaped by 21st-century advances in technology and information literacy, expanding both their spaces and their service scope. As technology reshapes how information is produced, organised, and retrieved, it is also reshaping how people behave toward and experience that information¹. Consequently, libraries continue to balance their traditional role as knowledge repositories with the integration of digital technologies and innovative services², though this shift has not occurred evenly, wherein public libraries, in particular, remain constrained by limited financing, collections, and institutional support³. These pressures have pushed library and information science professionals to move away from circulation counts and collection size and toward a deeper understanding of how users actually engage with what the library offers.

User experience (UX), a concept rooted in human-computer interaction and product design, offers exactly this lens, capturing the full picture of how a user perceives and interacts with the library rather than relying on conventional metrics such as circulation or collection size. Recurring themes in this literature include service space design, technological impact, and student engagement⁴, and applying UX principles to library websites has been shown to meaningfully improve convenience and ease of use⁵. Moreover, physical spaces remain central to this picture in which students prefer libraries offering flexible study areas, adequate lighting, comfortable furniture, and easy access to services and technology⁶; interior design quality, spatial diversity, environmental comfort, and control over learning spaces are similarly strong predictors of student satisfaction⁷; and direct physical upgrades produce measurable gains in satisfaction and engagement⁸. Increasingly, students view libraries not as repositories of information but as environments that support focused study, collaboration, and independent learning.

Furthermore, digital user experience has become an equally central concern. Digital technology adoption in academic libraries has accelerated considerably in response to rapid innovation and shifting user expectations⁹, and libraries must now adapt their UX research methodologies to account for both physical and digital interactions in increasingly “phygital” environments¹⁰. High user satisfaction has been reported for both print and digital resource accessibility¹¹, though internet connectivity and technology infrastructure remain areas where many library systems fall short¹²; a gap that can undermine users’ overall perceptions of service quality.

Despite continued investment in digital technologies, the human dimension of library service remains indispensable. Staff responsiveness, subject knowledge, and interpersonal skill continue to show up as major drivers of user satisfaction: meaningful library experiences hinge heavily on human interaction, with users judging service quality largely by how attentively staff respond to their information needs¹. Applying the SERVQUAL framework, service quality has been linked directly and significantly to user satisfaction¹³, staff service has emerged among the strongest predictors of overall satisfaction¹⁴, and staff responsiveness and approachability are consistently rated among the most valued attributes of library service¹¹. The emotional dimension of service

such as how users feel during interactions with staff is among the most influential factors shaping perceived quality⁹.

Despite this growing body of literature, several gaps remain. Most recent studies emphasise academic libraries, leaving school and public libraries comparatively overlooked even though they serve different communities and contexts^{9,7}; existing work tends to treat physical, digital, and service-related experience separately rather than as an integrated whole; and predictive analyses linking specific UX dimensions to satisfaction outcomes remain rare, particularly in cross-cultural contexts. This study addresses these gaps by comparing physical spaces, services, and digital platforms across library sectors, drawing on a cross-cultural sample of school, academic, and public library users in the Philippines and Qatar. Specifically, it examined (1) the demographic profile of respondents; (2) the levels of Physical User Experience (PUE), Digital User Experience (DUE), and Service-Oriented User Experience (SOUE); (3) the significant difference in user experience and overall library satisfaction across library sectors; (4) how PUE, DUE, and SOUE predict overall library satisfaction and comparative library experience; and (5) what framework could translate these findings into practical improvements.

2. MATERIALS AND METHODS

2.1 Research Design

This study employed a combination of three quantitative approaches to examine user experience (UX) across library sectors. Descriptively, it measured respondents' levels of PUE, DUE, SOUE, overall library satisfaction, and comparative library experience. Comparatively, it tested whether these levels differed significantly by library sector using Analysis of Variance (ANOVA). Predictively, it used Multiple Linear Regression to gauge how much each UX dimension contributed to overall satisfaction and comparative experience¹⁵.

2.2 Population and Sampling

Data were gathered from 188 respondents across school, academic, and public libraries in two countries: 138 (73.4%) from the Philippines and 50 (26.6%) from Qatar. Moreover, respondents comprised 135 students, 49 faculty and staff, three community members, and one librarian, selected through convenience sampling given the cross-institutional and cross-national scope of the study. Participation was voluntary, and respondents completed an online questionnaire distributed through institutional communication channels and social networks.

2.3 Research Instruments

A structured questionnaire, distributed through Google Forms, gathered demographic information (type of library, frequency of use, user type, location) alongside Likert-scale items measuring PUE, DUE, and SOUE, overall library satisfaction, and comparative library experience. Each item used a five-point scale from 1 (Strongly Disagree) to 5 (Strongly Agree), with mean scores interpreted as Very Positive (4.21–5.00), Positive (3.41–4.20), Moderate (2.61–3.40), Negative (1.81–2.60), or Very Negative (1.00–1.80) Experience. The instrument was piloted with 30 library users, yielding Cronbach's alpha coefficients of .91 (PUE), .89 (DUE), .93 (SOUE), and .92 overall; all within the good-to-excellent range¹⁶.

2.4 Data Gathering and Ethical Considerations

Following institutional clearance, the survey opened with a consent screen explaining the study's purpose, voluntary participation, and confidentiality, and collected no personally identifying information beyond the demographic variables specified. Respondents could withdraw at any time without consequence, and all data were coded, stored on a protected drive accessible only to the research team, and processed in compliance with the Philippines' Data Privacy Act of 2012 (Republic Act No. 10173) and comparable international privacy principles for Qatar-based respondents. As the study involved no sensitive populations, experimental procedures, or deceptive practices, formal institutional review board approval was not required.

2.5 Data Analysis

This study used SPSS in data processing and analysis. Demographic profiles were summarised through frequencies and percentages; weighted means and standard deviations captured UX, satisfaction, and comparative-experience levels; ANOVA tested differences across library sectors; and Multiple Linear Regression assessed how much PUE, DUE, and SOUE each predicted overall satisfaction and comparative experience. Effect sizes were calculated using Eta Squared (η^2) and interpreted against Cohen's benchmarks of small (.01), medium (.06), and large (.14)¹⁷, with significance set at the 0.05 level throughout.

3. RESULTS

3.1 Demographic Profile of Respondents

Table 1 presents the demographic profile of respondents. School library users made up the largest group (52.1%, $n = 98$), followed by academic (37.2%, $n = 70$) and public library users (10.6%, $n = 20$). The low share of public library users likely reflects broader patterns of public library under-utilisation linked to limited funding and institutional support³. Most respondents used their library daily (52.1%) or weekly (22.9%), together accounting for three-quarters of the sample and grounding their UX ratings in repeated, firsthand experience, consistent with prior findings that library users frequently visit daily for research and resource access¹¹. Students comprised 71.8% of respondents, followed by faculty/staff (26.1%), community members (1.6%), and one librarian (0.5%), while 73.4% of respondents were from the Philippines and 26.6% from Qatar. A direct statistical comparison between the two countries was not conducted given their unequal sample sizes — a limitation addressed further below.

Table 1. Demographic Profile of Respondents (N = 188)

Category	Indicator	f	%
Type of Library	Academic Library	70	37.2
	Public Library	20	10.6
	School Library	98	52.1
Frequency of Use	Daily	98	52.1

	Weekly	43	22.9
	Monthly	18	9.6
	Rarely	28	14.9
	As per needed	1	0.5
User Type	Student	135	71.8
	Faculty or Staff	49	26.1
	Community Member	3	1.6
	Librarian	1	0.5
Location	Philippines	138	73.4
	Qatar	50	26.6

3.2 Levels of User Experience

Table 2 presents descriptive statistics for the three UX dimensions. All three were rated Very Positive, with PUE recording the highest composite mean (4.86, SD = .332), followed by SOUE (4.70, SD = .431) and DUE (4.50, SD = .656). Within PUE, cleanliness and maintenance (M = 4.91) and ease of navigating the library's layout (M = 4.90) rated highest, while physical accessibility features rated lowest yet still Very Positive (M = 4.77). Within DUE, website/portal usability rated highest (M = 4.55) and adequacy of digital tools rated lowest (M = 4.41); Compared with the other dimensions, DUE demonstrated the lowest composite mean and greatest variability, indicating greater opportunities for improvement in digital services than in physical or service-related areas, consistent with prior findings that internet connectivity and technology infrastructure remain underperforming in many library systems¹². Within SOUE, staff helpfulness and responsiveness rated highest (M = 4.73), tracking with the SERVQUAL framework's emphasis on staff reliability and empathy as central to service quality judgments¹³.

Table 2. Descriptive Statistics for User Experience Dimensions

Dimension	Composite Mean	SD	Highest-rated item	Lowest-rated item
PUE	4.86	.332	Cleanliness/maintenance (4.91)	Accessibility features (4.77)
DUE	4.50	.656	Website/portal usability (4.55)	Adequacy of digital tools (4.41)
SOUE	4.70	.431	Staff helpfulness (4.73)	Reference assistance / consistency (4.67)

Scale: 4.21–5.00 Very Positive; 3.41–4.20 Positive; 2.61–3.40 Moderate; 1.81–2.60 Negative; 1.00–1.80 Very Negative Experience.

3.3 Differences in User Experience Across Library Sectors

One-way ANOVA confirmed statistically significant differences across library sectors in all three UX dimensions, for both overall satisfaction and comparative library experience (all $p < .001$; Table 3), with large effect sizes throughout ($\eta^2 = .278-.532$). Among the three UX dimensions, SOUE demonstrated the largest effect sizes for both outcomes, highlighting the substantial influence of service quality across library sectors^{1,14,11}. DUE also showed substantial effect sizes, reflecting differences in digital infrastructure investment across library types.

Table 3. Analysis of Variance in UX Dimensions by Library Sector

Dimension	Outcome	F	Sig.	η^2	Effect Size
PUE	Overall Satisfaction	41.098	.000	.308	Large
	Comparative Experience	35.565	.000	.278	Large

DUE	Overall Satisfaction	60.427	.000	.395	Large
	Comparative Experience	78.143	.000	.458	Large
SOUE	Overall Satisfaction	99.297	.000	.518	Large
	Comparative Experience	105.148	.000	.532	Large

3.4 Predictors of Overall Satisfaction and Comparative Library Experience

Multiple linear regression showed that all three UX dimensions significantly predicted overall library satisfaction, with SOUE the strongest predictor ($\beta = .476$, $p < .001$), followed by DUE ($\beta = .207$, $p = .003$) and PUE ($\beta = .190$, $p = .001$; Table 4). For comparative library experience, SOUE again led ($\beta = .466$, $p < .001$) followed by DUE ($\beta = .315$, $p < .001$), while PUE was not a significant predictor ($\beta = .080$, $p = .150$) — suggesting that when users compare their library to others, they weigh staff interactions and digital services more heavily than the physical environment itself. These results echo prior findings that service delivery and staff responsiveness are critical determinants of library satisfaction^{14,11}, that service quality remains among the most influential factors shaping user perceptions⁹, and that both physical and digital usability substantially shape how users perceive library systems¹⁰.

Table 4. Multiple Linear Regression Predicting Overall Satisfaction and Comparative Library Experience

Predictor	Outcome	β	t	Sig.
PUE	Overall Satisfaction	.190	3.337	.001
DUE	Overall Satisfaction	.207	3.020	.003
SOUE	Overall Satisfaction	.476	6.850	.000
PUE	Comparative Experience	.080	1.444	.150

DUE	Comparative Experience	.315	4.705	.000
SOUE	Comparative Experience	.466	6.852	.000

4. DISCUSSION

Taken together, these findings show that library users across sectors report strongly positive experiences, but that the drivers of satisfaction differ from the drivers of comparative judgment. Physical comfort matters for how satisfied users feel day to day, but service quality and digital capability are what differentiate one library from another in users' eyes. This has a clear practical implication: libraries seeking to improve competitively should prioritise investment in staff training and digital infrastructure over physical renovation alone, without neglecting the baseline physical standards users already rate highly.

Drawing on these findings, the Library User Experience Enhancement Framework (LUXEF) was developed as an evidence-based Input-Process-Output model anchored in Garrett's Elements of User Experience Model¹⁸ and the SERVQUAL Theory¹⁹, structured as a phased, evidence-based guide for library administrators. LUXEF comprises four components, summarised in Table 5: Service Excellence Enhancement, which responds to SOUE as the strongest predictor of both outcomes through staff training, service standards, and feedback mechanisms; Digital Infrastructure Enhancement, addressing DUE through improved Wi-Fi, OPAC usability, and digital collections; Physical Space Enhancement, sustaining the already-strong PUE ratings through accessibility and comfort upgrades; and Continuous Assessment and Monitoring, institutionalising annual UX surveys and sector-specific benchmarking. Implementation is proposed in four phases over two years, prioritising service excellence and digital infrastructure — given their greater predictive weight — before physical space upgrades and continuous monitoring. Full component-level strategies, performance indicators, the phased implementation timeline, and LUXEF's alignment with each of the study's five specific objectives are provided in Supplementary Material (Tables S1–S3).

Table 5. Library User Experience Enhancement Framework (LUXEF) Components

Component	Objective	Key Strategies	Expected Outcome
A. Service Excellence	Build service quality and responsiveness (SOUE = strongest predictor)	Staff training; service standards; feedback mechanisms	Responsive, user-centered service delivery

B. Digital Infrastructure	Improve accessibility/reliability of digital systems (DUE)	Wi-Fi upgrades; OPAC usability; expanded digital collections	Reliable, accessible digital services
C. Physical Space	Sustain physical comfort and accessibility (PUE)	Maintenance protocols; accessibility upgrades; wayfinding	Clean, accessible, comfortable spaces
D. Continuous Assessment	Institutionalise evidence-based improvement	Annual UX surveys; sector benchmarking; UX Committee	Sustained, data-driven improvement cycle

5. CONCLUSION

This study examined user experience across school, academic, and public libraries in the Philippines and Qatar through 188 respondents. Library users rated their physical, digital, and service-oriented experiences as Very Positive overall, though digital experience lagged behind physical and service-oriented experience. Significant differences in UX existed across library sectors, with large effect sizes throughout, and both SOUE and DUE significantly predicted overall satisfaction and comparative library experience, while PUE predicted only overall satisfaction. These findings demonstrate that despite libraries continuing to digitise, human service quality remains the strongest driver of how users judge their library experience.

Several limitations should be noted: the convenience sampling and unequal Philippines–Qatar sample sizes limit generalizability and preclude direct cross-country comparison; self-reported responses may be subject to social desirability bias; and the cross-sectional design does not permit causal inference. Future research should employ probability sampling, more balanced cross-national samples, and longitudinal designs.

Based on these findings, library administrators are encouraged to prioritise continuous professional development in staff responsiveness and service delivery, sustain investment in digital infrastructure such as OPAC usability and reliable internet access, and conduct regular sector-specific UX benchmarking to guide targeted, evidence-based improvement. The proposed LUXEF framework offers a structured starting point for this work and merits pilot-testing across library sectors.

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