



Service Quality Assessment Of A Digital Library Platform: Towards Quality Research For A Developed Nation

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Abstract: Growing concern on the availability, quality and ease of access of e-resources has initiated the development of digital library platforms providing access to users for e-books, e-journals and e-databases to add value to the research work of academia and research scholars. This paper plays an imminent role in the design of library services that will enhance sustainable research, contributing to a nation's need for continuous innovation and survival. This is the need of the hour for a country like India working towards "Developed India" status at the turn of 100 years of Indian Independence ("Viksit Bharat 2047"). The focus of this paper is on evaluating the performance of a digital library platform administered by a central university, using the LibQUAL+ framework, and thereby assessing library users' overall satisfaction. The study is conducted on a sample of 50 research scholars across various disciplines using a self-administered questionnaire and a multiple regression model to explore the strength of the factors on overall satisfaction. The research has brought out the significance of the affect of service and library as a digital platform on overall satisfaction. The paper proves LibQUAL+ to be a useful instrument to evaluate the digital library services and redesign areas of improvement on the digital library platform in order to contribute to the academic and research forums in the best possible way.

Keywords: E-Resources, LibQUAL+, Digital Library, Affect of Service, Information Control, Digital Library Experience.

I. INTRODUCTION

Innovation is the key to the growth and development of a nation, and one cannot undermine the role of universities in contributing to growth that comes from innovation (Veugelers n.d.). It is here that academic research in the universities should be leveraged (Cohen, Nelson, and Walsh, n.d.). This is the need of the hour for a country like India working towards a “Developed India” status at the turn of 100 years of Indian Independence (Viksit Bharat 2047). Today, the growing trends of e-resources in academic libraries play a very important making access to updated information easy and quick (Patil 2018). Increasingly, libraries are moving to digital from print formats, while journals and digital books with value-adding multimedia features are being created by publishers. Digital resources enable multiple users to access them remotely, increasing efficiency. To reduce expenses, libraries are collaborating to share these resources. Moreover, tools such as e-books, e-journals and databases are gaining popularity as they effectively cater to the needs of both students and researchers.

Studies, on the other hand, show libraries are under pressure to deliver value to academic contributions as research seeks priority in academic and university output. The need for well-defined criteria for assessing e-resources, which have become increasingly significant in the evolving digital library landscape (Noh 2012) It is also identified by studies in the recent past. Resources such as web databases, e-books, e-journals, and similar digital materials are often overlooked or insufficiently represented in conventional evaluations of academic libraries. The LibQual+ tool (Saunders, 2007) has been successfully adapted by the Association of Research Libraries (ARL) from SERVQUAL to measure service quality criteria. This is recognised as a standardised tool across more than 1000+ libraries in many disciplines. Research has shown more interest in the validation of the LibQUAL+ tool and has developed a standardised tool to assess library users' perception of service quality, like the SERVQUAL tool for service sector assessment. Also, it is suggested to include the satisfaction of the users of the library services while considering expanding the study to other geographical locations (Noh 2012) and to compare and contrast the results. This will also be of immense benefit to the library sample being considered to evaluate its service performance and take measures that would enhance satisfaction in line with user expectations.

II. Literature Review

E-resources or digital library refer to e-databases, e-books, e-theses, e-journals, etc, and can only be accessed using computers, providing information in formats such as text, images, multimedia and more (Padval 2022). These resources are accessible through media like CD-ROMs or the internet and have become essential in libraries due to their convenience, affordability and ease of searching. As technology progresses, libraries are relying more on e-resources to meet users' demands, offering practical alternatives to traditional formats, especially when no other versions are available. In the 21st century, library and information services are rapidly changing with electronic publishing becoming a major influence (Kenchakkanavar n.d.). Libraries now offer access to both traditional print collections and digital resources, as the internet reshapes the way people live and acquire knowledge. However, early studies in an Indian context on the service performance

of libraries have stated that process automation prevails in libraries rather than digitisation of e-resources observed in a few places. Problems observed have been towards the user, search, content and network related. A recent study on user satisfaction (Tenya, Maina, and Awuor 2023) with digital platforms in a university library in Kenya has been perceived to be facing navigation difficulties, apart from digital library resources not meeting the user expectations.

III. Theoretical Framework and Hypothesis Development

Experts traditionally describe the quality of an academic library based on its collection size, the volume of its holdings and various usage metrics (Asemi, Kazempour, and Ashrafi Rizi 2010). (Parasuraman, Zeithaml, and Berry 1988) developed a multidimensional instrument, SERVQUAL, that is widely used to measure gaps between customer expectations and perceptions of service quality in the modes of tangibility, reliability, responsiveness, assurance, and empathy. This has been the basis for the design of LIBQUAL+ (Cook et al. 2001) and has been used popularly to measure the service quality of library services. It defines the core areas as Library Information Control, which evaluates accessibility and quality of information resources, Library as a Place that refers to the physical environment and/or digital library experience and Affect of Service that measures interpersonal aspects such as empathy, responsive care provided by the library staff (Heath et al. n.d.).

LibQUAL+ is the outcome of Texas A&M and ARL, and has been successful in assessing service quality gaps between expected and perceived service delivery, and contributes to the quality research of academia, students and research work. LibQUAL+ has been applied to various library environments and is regarded as a pioneer tool as of today (Heath, 2003).

LibQUAL+, adapted from SERVQUAL, underwent a thorough re-grounding for academic libraries through a detailed qualitative phase (Cook et al. 2001), and the LIBQUAL+ instrument has become widely adopted and validated in academic library settings as a flexible framework to capture diverse user perspectives across different library services (Brito and Vergueiro 2013). According to (Heath et al. n.d.) emphasis on service quality is a more customer-centred and innovative personalised approach in library operations,

3.1 Affect of Service (AOS_T) focuses on interpersonal aspects of usage of digital library service, specifically the empathy, responsiveness and care provided by the e-resources platform (Asemi et al. 2010) highlighting the user interface with e-resources through the support team and their knowledge in resolving issues, assisting users and ease of navigating through the instructions online. The findings of a study about the affect of service (Tenya et al. 2023) showed that users experienced information overload and found the support interface to be uncooperative in accessing the resources. This was coupled with a lack of Information Technology knowledge to use e-resources. Further, with the rise in the deployment of digital library apps that can not only provide quick answers to queries through chats and chatbots, predicting the user's need for relevant information through prompts requires users to be aware of the technology features and usage.

Affect of Service is an important factor that can ensure that the e-resources are made accessible to the users in the right time and the right format, else it delays the user access to information. In the case of a digital library, the user interface and user experience in navigating through the platform play an important role.

H1: The Affect of Service has a significant influence on overall user satisfaction of digital library platforms.

3.2 Information Control (IC_T) - This refers to the availability, quality and accessibility of e-resources on the platform and consists of users' access to electronic resources through search engines, personal bookmarks or publisher websites (Fagan 2014). The user can access and use the content at their convenience, but it should be organised in the best possible way so that it can be accessed very easily. This is made possible by the indexing of digital content, which makes retrieval easy. It equally depends on the storage device deployed and the need to meet its technical requirements, which change very fast. The internal technical facility coordinates the digital library interface with the user, providing seamless delivery of required information to the user (Abdul Rahman and Mohezar 2020).

H2: Information Control has a significant influence on the overall user satisfaction of digital library platforms.

3.3 Library as a Place (LD_T) (Digital Platform Experience) - In the case of e-resources, it refers to the digital platform experience by the users while they collect the required information. Generally, a place inspires, motivates and fosters learning through designed spaces (Choshaly and Mirabolghasemi 2019). The environment invites focus and exploration. As libraries transform with digital technology into a virtual platform for learning, researching, browsing, and collaboration with access to resources, tools and interactive environments from anywhere (Brito and Vergueiro 2013). The user experience and interface become an important factor that can drive satisfaction. A platform that is user-friendly for accessing e-books, databases and multimedia resources with secure features makes use of the platform indispensable for sustainable growth for academicians, researchers, and learners (Choshaly and Mirabolghasemi 2019). This then results in formulating the following hypothesis;

H3: Library as a Place (Digital Platform experience) has a significant influence on overall user satisfaction.

This paper adopts this widely used instrument to measure the overall satisfaction with the digital library platform.

IV. RESEARCH METHODOLOGY

The study is conducted at the central university library in Puducherry, located in India. The library has state-of-the-art modern infrastructure facilities and is acclaimed to be a disability-friendly library, and provides round-the-clock access to its vast e-resources consisting of e-databases, e-books, e-journals, e-theses, etc. The library has an old building and state of a art new building and has many sections like Book Stack section, Research scholar hub, postgraduate students' hub, Journal section, competitive examination section, digital library service section with computers that are wifi enabled, etc. It has launched "My Library on my Fingertip" MYLOFT app to provide anywhere, anytime access to the library resource base and the login can be accessed from 3 devices at a time. Apart from the conventional sections, it also has the United Nations depository section. Louis Braille Centre (for the visually impaired), Bloomberg Room, Encyclopaedias and Group discussion sections, to name a few. The study uses the LibQUAL+ tool (Cook et al. 2001), consisting of 22 items measuring the affect of service, information control and library as a digital platform. 1 item "Self-learning is easy" was included under the affect of service for the study. All the statements were measured using a 5-point Likert scale. The respondents were selected using a convenience sampling method, and the

sample size is 50 and was limited to research scholars as they are the primary users of the research database, and their research contribution adds to the innovation output of the university and the nation. Research scholars in the various disciplines like humanities and social science, science, arts and languages were surveyed through a Google form and also using a self-administered questionnaire. Multiple regression analysis using SPSS was used to analyse the data obtained.

V. Objectives

The study is designed to measure the affect of service, information control and library as a place (digital experience) in predicting the overall satisfaction in the use of the digital library platform.

VI. Discussion of Results

6.1 Sample Descriptive

The respondents consisted of 65% males and 35% females. They were in the age group of 25 – 28 Years (48.3%), followed by the 33+ age group (21%). The respondents were from various disciplines like Management & Humanities (72%), Science (13%) and Arts & Languages (13%). The majority of the sample consisted of fresher (31%), followed by senior research scholars (27%) and junior scholars (20%). The scholars were mostly using laptops (48%), followed by Android phones (31%), for access, while some also used iOS/MacBook (6.9%). The majority of users use only one device at a time to access (62%). Frequency of use of the digital library platform was found to be sometimes (34%) and rare (31%), while often usage was only (13%). On average, users spent less than 30 minutes (45%) on the University digital library platform, followed by 30 minutes – 1 hour (24%), and 1 hour – 3 hours (20%). The major purpose of visiting was for research work (82.8%), followed by publication (13.8%) and for coursework (3.4%).

6.2 Gender based Overall Satisfaction with the Digital Library Platform

Gender influence on overall satisfaction is tested using ANOVA analysis, and this is seen in Table 1.

Table 1: ANOVA statistics of Gender versus Overall Satisfaction

OS_T	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1.503	1	1.503	.153	.699
Within Groups	265.532	27	9.835		
Total	267.034	28			

(Source: Primary Data)

The p-value (0.699) is greater than (0.05), and this indicates that there is no statistically significant difference between gender and overall satisfaction. The same is also observed in the mean values of overall satisfaction by gender.

6.3 Duration of Research Work and Overall Satisfaction with the Digital Library Platform

The significant influence of the duration of undertaking the research work on the satisfaction with the usage of the digital library platform is tested with ANOVA, and the results are shown in Table 2.

Table 2: ANOVA statistics of Duration of Research Work versus Overall satisfaction

OS_T

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	82.993	3	27.664	3.758	.024
Within Groups	184.042	25	7.362		
Total	267.034	28			

(Source: Primary Data)

The p-value (0.24) is less than (0.05), and this indicates that there is a statistically significant difference between the duration of undergoing research work and overall satisfaction. The same is also observed in the mean value of overall satisfaction for the fresher research scholars (7.33) being greater than the junior and senior research scholars (11.83) in overall satisfaction. This is also justified by the aspect that usage of the digital library has met maximum expectations in the later years.

6.4 Discipline of the Research Scholar and Overall Satisfaction with the Digital Library Platform

Anova analysis was used to test whether the discipline has a significant influence on overall satisfaction.

Table 3: ANOVA statistics of Department versus overall satisfaction

OS_T

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	13.332	2	6.666	.683	.514
Within Groups	253.702	26	9.758		
Total	267.034	28			

(Source: Primary Data)

Table 3 shows that the p-value (.514) is greater than (0.05), and this indicates that there is no statistically significant difference between the discipline of the research scholar and overall satisfaction.

6.5 Factors influencing Overall Satisfaction with the digital library platform

Multiple Regression Model plays an important role in testing the strength of the influence of the library service quality variables of LibQUAL+ tool in predicting the level of the independent variables: Affect of service, Information Control and Library as place (digital platform experience) on the dependent variable (Overall Satisfaction).

Table 4 R value

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.903 ^a	.816	.794	1.402

a. Predictors: (Constant), IC_T, AOS_T, LD_T

(Source: Primary Data)

From Table 4, the R value explains the quality of the prediction of the dependent variable. In this case, Overall satisfaction has a value of (R=.903) that indicates a good level of prediction. The R-squared value (.816) tells the independent variable explains 81% of the variability of our dependent variable.

Table 5 Predictors for Overall Satisfaction

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	217.918	3	72.639	36.973	.000 ^b
	Residual	49.116	25	1.965		
	Total	267.034	28			

a. Dependent Variable: OS_T

b. Predictors: (Constant), IC_T, AOS_T, LD_T

(Source: Primary Data)

Table 5 denotes the F-value (36.973) and the corresponding p-value (0.000), which is less than 0.05, indicating that the regression model is statistically significant, which means that the regression model is fit for the data. The regression equation predicting Overall Satisfaction (OS_T) from the independent variables Affect of Service, Library as Digital Platform, and Information Control is stated as below from Table 6.

$$\text{Predicted OS}_T = -2.364 + (0.210 \times \text{AOS}_T) + (0.098 \times \text{LD}_T) + (0.209 \times \text{IC}_T)$$

Table 6: Multiple Regression Model

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-2.364	1.270		-1.861	.074
AOS_T	.210	.097	.330	2.159	.041
LD_T	.098	.132	.143	.743	.465
IC_T	.209	.064	.503	3.276	.003

a. Dependent Variable: OS_T

(Source: Primary Data)

Hence, the coefficients indicate how much the dependent variable, overall satisfaction, changes with a one-unit increase in an independent variable. As the unstandardized coefficients for AOS_T and ICT are only significant, we can say that for every one-unit increase in AOS_T, OS increases by 0.210 units. The largest impact is observed for Information Control, where a one-unit increase in IC_T leads to 0.209 0.209-unit increase in OS. These coefficients highlight the relative contribution of each predictor to overall satisfaction with the digital library platform.

We see that information control and the affect of service have contributed to overall satisfaction. While the digital experience consisting of user experience and interface that results in easy navigation has not contributed to overall satisfaction. It may also be noted that the university library being studied has also introduced a new app for the usage of e-resources, which may also be causing some transformation issues among the users and the library. This calls for a detailed look into the navigation interface or calls for imparting training on the various digital platform services to the users. Identifying glitches and solving them is also needed.

Affect of service seems to be significantly contributing to satisfaction, and this is a good symptom as physical interactions are slowly being displaced by virtual interactions; the respondents need support from the physical system as well as necessary training to use the online technical support services to use the digital library. This also addresses gaps in studies (Hudin, 2023) as the digitisation of libraries takes place. The paper also shows through information control that having a good collection and being able to access it easily is very important to their satisfaction. This may be influenced not only by the library website but may also be accessed through other modes like search engines, journal sites, etc.

VII. Implications and Scope for Future Work

Firstly, the study shows the need to reduce the technical glitches experienced by the scholars and also consider providing workshops on the usage/technical support available on the digital platform. Secondly, in terms of Information control, more quality resources to be added to the database after a proper assessment of their research needs in different disciplines. Next, this study time and again proves LibQUAL+ to be a useful

instrument to evaluate the digital library services of any library operating in the public and private domain to assess its service quality and redesign services to contribute to the academic and research forums in the best possible way. This can be emulated by libraries in the public and private domains, catering to research in India as the country works towards “Developed India” by 2047. LibQUAL+ is definitely a de facto tool to be implemented at regular intervals to ensure seamless service performance from the libraries. The study can be done with students pursuing undergraduate, postgraduate students and part-time research scholars. This will enable us to design a better user experience and interface that may facilitate the best contribution by the libraries. Also, considering the assessment of the library as a place for the physical and virtual library-related components can be explored in depth, as both coexist in many places.

VIII. Conclusion

LibQUAL+ as a de facto tool to measure the service performance of libraries and to take suitable measures to enhance services has been examined. The paper is capable of highlighting that user perception in this study was driven by a good interface with the physical (human) and virtual(technical) services provided by the library (Affect of Service), and in terms of availability, access and quality of resources (Information Control). While some strategies need to be exploited to enhance the user experience and interface.

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