



## THE MEDIATING EFFECT OF SERVICE EFFICIENCY ON THE INFLUENCE OF LIBRARY ENVIRONMENT, LIBRARY RESOURCES AND LIBRARY USER SATISFACTION IN AN ACADEMIC LIBRARY IN BUKIDNON

Analy J. Damiles <sup>1</sup>, Annabelle P. Acedera <sup>2</sup>

*MLIS program, Lourdes College, Inc., Cagayan de Oro City, Misamis Oriental, Philippines*

<https://doi.org/10.5281/zenodo.19696845>

### ABSTRACT

In the framework of academic libraries, user satisfaction is the main indicator of the service quality and effectiveness, as it determines how well the library meets the information needs and expectations of its users. This study was conducted since only few studied the mediating effect of service efficiency on the library environment, adequacy of resources, and library user satisfaction at one of the state universities in Bukidnon. This study employed a quantitative research design using a descriptive-correlational approach and Best-fit model analysis. The data collected were from 250 undergraduate students who actively utilized the library and were selected through random sampling. Confirmatory factor analysis (CFA) was used to confirm the validity of the questionnaire. Descriptive results showed that all variables were rated as generally high, and indicates a positive user perception of the library services. Service efficiency and library user satisfaction obtained the highest mean, followed by library environment, and adequacy of resources. Mediation analysis revealed that the library environment strongly influenced service efficiency. In this framework, library environment and adequacy of resources serve as key inputs that are processed through service efficiency as the mediating variable, solely determining library user satisfaction as the primary outcome.

**Keywords:** *service efficiency, library environment, adequacy of resources, user satisfaction, academic libraries*

## INTRODUCTION

Academic libraries play a significant role in every institution. Its role provides teaching, learning, and research materials to every stakeholder. This includes the updated and reliable materials, a conducive environment, and satisfying resources. In today's era, libraries have adapted toward understanding not only the availability of the print and non-print resources and the conduciveness of the library environment, but also how their services efficiently and satisfyingly meet the evolving needs of every library user. Although several studies have explored the relationship among the library environment, resources, and user satisfaction, there is still limited research examining service efficiency as a mediating factor between these variables in one of the academic libraries in Bukidnon. Baffour et al. (2021) described library environment, resources and services as the key factors of the overall library user's satisfaction, this means that the more they are satisfied with the services, the more likely they are going to and recommend the library to their peers. Similarly, Samo and Agcito (2024) confirms that to obtain a positive perception from students, libraries should provide a more conducive environment partnered with a well-structured physical facility, environmental conditions, and learning resources that leads to improved comfort and satisfaction.

The study of Rani, M., & Sharma, N. (2024) observed that users were totally satisfied when the available resources in the library were adequate, reliable, up-to-date and sufficient collections, stressing that the resources are aligned with the subjects offered in every program. Furthermore, Ajith et al. (2023) on views regarding the effectiveness of the library services, identified the service efficiency as one of the central assessments and evaluation criteria together with the user satisfaction, collection development and the accessibility of all the resources. However, they also discussed measurable indicators like responsiveness, timeliness, and competence of the staff being assigned to assess and provide the service efficiency in the library.

This study pointed out the involvement and contribution of the library services to the educational development by focusing on the quality resources and services that are equipped with their lifelong learning and academic excellence, especially in today's users' diverse needs for information.

## Research Questions

This study assessed the mediating effect of service efficiency on library environment, adequacy of resources, and library user's satisfaction in one of the academic libraries of Bukidnon.

Specifically, it sought to answer the following questions:

1. What is the participants' assessment of the library environment in terms of:
  - 1.2 physical;
  - 1.3 learning;
  - 1.3 social; and

- 1.4 technological?
2. What is the participants' assessment of the library's adequacy of resources in terms of:
  - 2.1 books (print or electronic);
  - 2.2 journals (print or electronic); and
  - 2.3 audio-visual materials?
3. What is the participants' assessment of the library's service efficiency in terms of:
  - 3.1 promptness;
  - 3.2 accuracy;
  - 3.3 consistency; and
  - 3.4 quality?
4. What is the participants' level of satisfaction?
5. Are the library environment and adequacy of resources significantly associated with user satisfaction?
6. Do the participants' assessment of the learning environment and adequacy of resources significantly influence the user satisfaction?
7. Does service efficiency significantly mediate the influence of library environment and resources on user satisfaction?

## METHODOLOGY

This study employed a quantitative research design using a descriptive-correlational approach and Best-fit model analysis. The descriptive aspect was used to describe the current conditions of the library environment, available resources, service efficiency, and the level of user satisfaction. Meanwhile, the correlational aspect examines the relationships among these variables. The use of the Best-fit model allows for testing both the direct and indirect effects among the constructs, particularly the mediating role of service efficiency. The participants of the study were 250 undergraduate students enrolled in one of the state universities of Bukidnon who were active users of the University Library. Participants were properly informed about ethical guidelines, rules, and policies before participating in this survey.

The study employed random sampling. This sampling technique was appropriate for studies involving a large and organized population, such as university library users, and allows for an efficient and unbiased selection of participants. The primary data collection tools used in this study were researcher-made and structured questionnaires, which consisted of five parts. The data gathered were measured using the five-point Likert scale, ranging from 1 (Strongly Disagree), 2 (Disagree), 3 (Neither Agree nor Disagree), 4 (Agree), and 5 (Strongly Agree). The questionnaire was from previously validated instruments and relevant literature. Specifically: Part 2 (Library Environment), Part 3 (Adequacy of Resources), Part 4 (Service Efficiency) adapted from the SERVQUAL model developed by Parasuraman et al. (1988), followed by studies of Alam and Mezbah-ul-Islam (2022) and Barfi (2023), of service quality in academic libraries using LibQUAL-based instruments. Part 5 (Library User Satisfaction) adapted from Butt et al. (2023),

which utilized a modified SERVQUAL model to assess the overall library user satisfaction. Prior to the analysis and interpretation of the data, the research instrument underwent Confirmatory Factor Analysis (CFA) to establish its validity and reliability, all respective latent constructs are reliable, namely: Library Environment, Adequacy of Resources, Service Efficiency, and Library User Satisfaction. The data were analyzed using descriptive and inferential statistical tools such as frequency, percentage, weighted mean, and standard deviation.

## RESULTS

### 5. Are the library environment and adequacy of resources significantly associated with user satisfaction?

**Table 17**  
**Canonical results of Library User Satisfaction and Learning Environment**

Variable	Cross loading	R <sub>c</sub>	R <sub>c</sub> <sup>2</sup>	F(4,245)	p
Learning Environment		0.78	0.61	97.600*	<.001
Physical Environment	-0.65				
Learning Environment	-0.65				
Social Environment	-0.73				
Technological Environment	-0.68				
Library User Satisfaction	-0.78				

\*Significant at 0.05 two-tailed alpha level.

Table 17 shows the canonical correlation analysis between Library User Satisfaction and Learning Environment. The result revealed that there is a significant positive strong canonical correlation between Library User Satisfaction and Learning Environment,  $F(4, 245) = 97.600$ ,  $p < .001$ ,  $R_c = 0.78$ ,  $R_c^2 = 0.61$ . Therefore,  $H_{01}$  is rejected. It indicates that approximately 61 percent of the variability of Library User Satisfaction is explained by the Learning Environment. This means that higher levels of Learning Environment are associated with higher Library User Satisfaction. Social Environment (loading = -0.73) and Technological Environment (loading = -0.68) emerge as the strongest contributors in the Learning Environment construct. This shows that by improving the social and technological environment may help increase the library user's satisfaction.

Mihalik et al., (2022) previously emphasized the canonical correlation analysis as an effective method in probing the relationship between the two sets of variables, allowing the researchers to classify how and what groups of variables interact and contribute to the outcomes. Also, regression analysis is known to determine the projecting influence of the two variables, the independent variables on a dependent variable, allowing for the assessment of how the predictors affect outcomes (Carlos-Júnior et al., 2020). Jointly, these methods provide clear insights, where canonical correlation analysis explains the overall multivariate relationships, while regression analysis identifies the predictive

strength of specific variables.

**Table 18**  
**Canonical Correlation Analysis Between Library User Satisfaction and Adequacy of Resources**

Variable	Cross loading	R <sub>c</sub>	R <sub>c</sub> <sup>2</sup>	F(3,246)	P
Adequacy of Resources		0.66	0.44	64.541*	<.001
Books	-0.65				
Journals	-0.59				
Audio-visual Materials	-0.49				
Library User Satisfaction	-0.66				

\*Significant at 0.05 two-tailed alpha level.

Table 18 shows the canonical correlation analysis between Library User Satisfaction and Adequacy of Resources. The result revealed that there is a significant positive strong canonical correlation between Library User Satisfaction and Adequacy of Resources,  $F(3, 246) = 64.541$ ,  $p < .001$ ,  $R_c = 0.66$ ,  $R_c^2 = 0.44$ . Therefore,  $H_{02}$  is rejected. It indicates that approximately 44 percent of the variability of Library User Satisfaction is explained by Adequacy of Resources. This means that higher levels of Adequacy of Resources are associated with higher Library User Satisfaction. Books (loading = -0.65) and Journals (loading = -0.59) emerge as the strongest contributors in the Adequacy of Resources construct. The result suggests that strengthening Books and Journals may contribute to improvements in Library User Satisfaction.

## 6. Do the participants' assessment of the learning environment and adequacy of resources significantly influence the user satisfaction?

**Table 19**  
**Regression Analysis of the influence of Learning Environment and Adequacy of Resources on Library User Satisfaction**

Predictor	Unstandardized Coefficients		B	95% CI		t	p
	B	SE		Lower	Upper		
Constant	1.22	0.20		0.84	1.61	6.245*	<.001
Learning Environment	0.41*	0.05	0.432	0.31	0.51	8.088*	<.001
Adequacy of Resources	0.37*	0.05	0.387	0.27	0.47	7.245*	<.001

### Model Summary

$R=0.726$   $R^2=0.527$   $Adj R^2=0.524$   $F(2,247)=137.811^*$   $p<.001$

Note. B = unstandardized beta coefficient, SE = standard error,  $\beta$  = standardized beta coefficient, 95% CI = 95% confidence interval, t = t statistic, p = probability value. \*Significant at 0.05 two-tailed alpha level.

Model Equation:  $LUS = 0.41LE + 0.37AOR + 1.22$

Legend: LUS = Library User Satisfaction, LE = Learning Environment, AOR = Adequacy Of Resources

Table 19 presents the multiple regression analysis predicting Library User Satisfaction. The overall model was statistically significant,  $F(2, 247) = 137.81$ ,  $p < .001$ , with  $R = 0.726$ ,  $R^2 = 0.527$  and  $Adj R^2 = 0.524$ . This indicates that 52.4 percent of the variance in Library User Satisfaction was explained by the predictors. Learning Environment was a significant positive predictor ( $t = 8.09$ ,  $p < .001$ ,  $\beta = 0.432$ ), indicating that higher Learning Environment significantly influenced their Library User Satisfaction. Therefore,  $H_01$  is rejected.

Adequacy of Resources was a significant positive predictor ( $t = 7.25$ ,  $p < .001$ ,  $\beta = 0.387$ ), indicating that higher Adequacy of Resources is associated with higher Library User Satisfaction. The model equation is  $LUS = 0.41LE + 0.37AOR + 1.22$ . Therefore,  $H_02$  is rejected. The result suggests that Learning Environment and Adequacy of Resources play important roles in explaining variation in Library User Satisfaction.

### 7. Does service efficiency significantly mediate the influence of library environment and resources on user satisfaction?

**Table 23**  
**Mediation Analysis Summary Table**

Path	Total	Direct	Indirect	Mediation
Library Environment > Service Efficiency > Library User Satisfaction	0.831*	-0.160	0.992*	Full
Adequacy of Resources > Service Efficiency > Library User Satisfaction	0.198	0.224*	-0.026	None

\*Significant at .05 alpha level

Table 23 summarizes the mediation results of the two exogenous variables. For Library Environment, the total effect on Library User's Satisfaction was statistically significant (0.831,  $p < .05$ ), the direct effect was not significant (-0.160), and the indirect effect through Service Efficiency was statistically significant (0.992,  $p < .05$ ). This confirms full mediation, which means that Library Environment affects Library User's Satisfaction through Service Efficiency. On the other hand, Adequacy of Resources had a non-significant total effect (0.198), a significant direct effect (0.224,  $p < .05$ ), and a non-significant indirect effect through Service Efficiency (-0.226). This indicates no mediation. Overall, the table shows that Service Efficiency mediated only the influence of Library Environment on Library User's Satisfaction, but it did not mediate the influence of Adequacy of Resources on Library User's Satisfaction. This suggests that service efficiency plays a significant role in mediating. Environmental factors also contribute to positive user experience though less relevant in the relationship between the adequacy of resources and library user satisfaction. In other words, while a good environment needs efficient service to be appreciated, resources can stand on their own as direct contributors to satisfaction.

These results emphasize the need for a dual strategic focus in library management. First, investments in the library environment should be paired with improvements in service efficiency to ensure that users fully experience the benefits. Second, the library should continue strengthening its resource collections, as these have a direct and immediate impact on user satisfaction, regardless of service delivery mechanisms.

## Conclusions

The library environments, resources, and services strongly associated with the library user satisfaction in academic settings. The learning environments appear as key forces driving satisfaction, mainly through efficient service delivery, while resources directly contribute independently to library user satisfaction. This outlines the Expectancy-Confirmation Theory, where users view positively when actual experiences exceed expectations from physical facilities, social interactions, collaborative learning areas, technology access, collections from various formats, immediate responses, reliable information, steady operations, and a supportive environment. The service efficiency acts as mediation linking environmental factors to overall satisfaction. Eventually, all of these components served as an essential role in enhancing academic success through dependable and supportive organization.

## Recommendations

Through the findings and conclusion of the study, recommendations are projected to improve the library environment, adequacy of resources, and service efficiency to enhance library user satisfaction:

### 1. Library administration may:

- 1.1 acquire more updated and relevant audio-visual materials, multimedia learning resources and other electronic or digital resources to align with the academic programs offered in the institution.
- 1.2 guarantees that all audio-visual equipment be made available and accessible to all library users to support academically and effective utilization.
- 1.3 implement consistent monitoring and evaluation instruments to gather user feedback to assess the need for improvement in the overall library services.
- 1.4 made available the e-books, e-journals, and databases in off-campus access to support remote and flexible learning.
- 1.5 acquire more copies of reliable, relevant, and high-demand book titles to ensure that students sufficiently access the resources needed for their academic success.

### 2. Librarians may:

- 2.1 initiate to conduct regular promotions, orientations and demonstrations to the new technological facilities the library acquired, as actual experience led to

students' knowledge on how to utilize the OPAC, online databases, self-check kiosks, and even the book return systems.

2.2 ensure the consistency in service quality and delivery from all staff to gain full trust and satisfaction from the library user.

2.3 continue professional development through pursuing education, attending seminars and workshops to sustain high levels of professionalism in the service.

3. Faculty members are encouraged to:

3.1 utilize and introduce the library resources and services to their students, such as using them and requiring students to use the various collections the library has for their academic activities.

3.2 collaborate with librarians in selecting books that are aligned with the subjects offered by the program, promoting information literacy programs and how to utilize the library collections, as they will benefit academically by utilizing the overall services.

4. Students are encouraged to:

4.1 regularly utilize all the library services from books, electronic devices, online databases, and technological tools like OPAC, self-check kiosk, book return system, and other technological facilities.

4.2 partake in library orientations, demonstrations and training programs for them to be knowledgeable in accessing resources and the use of technological facilities efficiently.

4.3 to give feedback on the services and resources for the library to determine the need for improvement.

5. Future researchers are encouraged to:

5.1 discover other possible mediating variables that determine the user satisfaction.

5.2 to conduct comparative studies across different institutions to validate the findings whether similar relationships exist in other academic library settings.

### **Compliance with Ethical Standards**

The author finalized the research instrument and was validated by the panel members and reviewed by the Lourdes College Research Ethics Committee to ensure clarity and relevance of the research framework. The author secured the approval from the Bukidnon State University Research Ethics Committee and university president prior to data gathering. Participants were informed of the purpose of the study which is solely for the research purposes only, assured that their participation was voluntary, and guaranteed confidentiality and anonymity of their responses. No personally identifiable information was collected. Participation in the study was voluntary, and participants were informed of the purpose of the study and their right to withdraw at any time without



penalty. The author carefully organized, coded, and tabulated the data gathered. Responses were encoded into a statistical software program for analysis.

## Acknowledgments

The author extends profound appreciation to the Graduate School of Lourdes College for the excellent education it provides. Appreciation is also extended to the Master of Library and Information Science faculty members for helping and supporting the researcher's academic journey, and continuously guiding students to improve, move forward, and achieve their goals.

Sincere appreciations are expressed to the Thesis Writing 1 professor, Dr. Cyril Chavez, and the Thesis Writing 2 professor, Dr. Miguela B. Napiere, for providing guidance and valuable insights throughout Thesis Writing. Gratitude is also extended to the mentor, Mrs. Annabelle P. Acedera, for her dedication, expertise, and unwavering support during the entire thesis journey, as well as to the rest of the panel members who shared their expertise to complete this study. Their commitment has made a meaningful impact on the completion of this research.

Sincere appreciation is extended to one of the State Universities in Bukidnon and all its stakeholders who contributed to and participated in this research. Their unconditional support helps a lot in this success.

Deepest thanks are also offered to the participants and the University Library family for their time, effort, support and cooperation, which significantly contributed to the completion of this study.

Above all, the author wholeheartedly grateful to the Almighty God for his unconditional love, blessings, and guidance toward the successful completion of this thesis.

## REFERENCES

- Ajith, J., Ramanayaka, K., & Weerasooriya, W. (2023). Assessing the effectiveness of academic library services: A review on the formulation of a feasible conceptual framework. *Information Development*, 41(1), 120–137. <https://doi.org/10.1177/02666669231161588>
- Alam, M. J., & Mezbah-Ul-Islam, M. (2022). Impact of service quality on user satisfaction in public university libraries of Bangladesh using structural equation modeling. *Performance Measurement and Metrics*, 24(1), 12–30. <https://doi.org/10.1108/pmm-06-2021-0033>
- Baffour Gyau, E., Liu, J., & Kwakye, O. (2021). Evaluation of user satisfaction with academic libraries services based on students' perspectives. *Open Access Library Journal*, 8, e7783.
- Barfi, K. A., Parbie, S. K., Filson, C. K., Teye, M. V., Kodua-Ntim, K., & Ayensu, E. (2023). Assessing the quality of services at an academic library. *Heliyon*, 9(12), e22449. <https://doi.org/10.1016/j.heliyon.2023.e22449>
- Butt, K., Arif, M., & Rafiq, M. (2023). Assessing University Students' Satisfaction with Web-Based Library Services Based on SERVQUAL Model: A Case of a Pakistani University. *Libri*, 73(2), 153–165. <https://doi.org/10.1515/libri-2022-0050>
- Carlos-Júnior, L. A., Creed, J. C., Marrs, R., Lewis, R. J., Moulton, T. P., Feijó-Lima, R., & Spencer, M. (2020). Generalized linear models outperform commonly used canonical

- analysis in estimating spatial structure of presence/absence data. *PeerJ*, 8, e9777. <https://doi.org/10.7717/peerj.9777>
- Mihalik, A., Chapman, J., Adams, R. A., Winter, N. R., Ferreira, F. S., Shawe-Taylor, J., & Mourão-Miranda, J. (2022). Canonical correlation analysis and partial least squares for identifying brain–behavior associations: A tutorial and comparative study. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 7(11), 1055–1067. <https://doi.org/10.1016/j.bpsc.2022.07.012>
- Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, 64(1), 12–40.
- Rani, M., & Sharma, N. (2024). Library resource utilization and user satisfaction study. *International Journal of For Multidisciplinary Research*, 6(5). <https://doi.org/10.36948/ijfmr.2024.v06i05.28039>
- Samo, S. J. P., & Agcito, M. R. (2024). Library support: Implications on student well-being. *British Journal of Multidisciplinary and Advanced Studies*, 5(2), 1–17. <https://doi.org/10.37745/bjmas.2022.0448>

**APA Citation:**

Damiles, A. J., & Acedera, A. P. (2026). THE MEDIATING EFFECT OF SERVICE EFFICIENCY ON THE INFLUENCE OF LIBRARY ENVIRONMENT, LIBRARY RESOURCES AND LIBRARY USER SATISFACTION IN AN ACADEMIC LIBRARY IN BUKIDNON. *Ignatian International Journal for Multidisciplinary Research*, 4(4), 1443–1452. <https://doi.org/10.5281/zenodo.19696845>

*analy.damiles@lccdo.edu.ph*  
*annabelle.acedera@lccdo.edu.ph*