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The Library as a Third Space: Structural Equation Modeling of Spatial Perception, Academic Engagement, and Psychosocial Well-being among Higher Education Students

Nelcy Ann G. Baja[1], Mylene Aguilar[2], Shekyna Limbo[3], Clarisse Ann B. Conti[4], Roxanne A. Datinguinoo[5], Mary Rose V. Navarro[6]

[1,2,3,4,5,6]University of Perpetual Help System Laguna

ABSTRACT

Academic libraries increasingly function as learning environments that support students' academic, social, and personal needs. This study examined the relationships among students' perceptions of academic library spaces, academic engagement, and psychosocial well-being, with particular attention to the mediating role of academic engagement. Using a quantitative, cross-sectional, descriptive-correlational design, the study analyzed survey responses from 157 higher education students in selected institutions in the MIMAROPA and CALABARZON regions of the Philippines. Confirmatory factor analysis and structural equation modeling were used to assess the measurement and structural models. Respondents reported generally positive perceptions of library spaces (M = 3.38, SD = 0.62), academic engagement (M = 3.26, SD = 0.64), and psychosocial well-being (M = 3.35, SD = 0.60). The constructs demonstrated high internal consistency, with Cronbach's alpha coefficients ranging from .956 to .965. The structural model produced the following fit indices: $\chi^2(402) = 878.73$, CFI = .908, TLI = .901, RMSEA = .087, and SRMR = .040. Spatial perception was positively associated with academic engagement (β = .853) and psychosocial well-being (β = .303); academic engagement was also positively associated with psychosocial well-being (β = .638). The indirect effect of spatial perception on psychosocial well-being through academic engagement was significant (β = .483, 95% CI [.357, .615]), consistent with partial mediation. The findings suggest that students' experiences of library spaces are associated with both their academic engagement and perceived well-being. Because the study used cross-sectional, self-reported data and purposive sampling, the results should be interpreted as associations rather than evidence of causation. The study offers practical considerations for developing inclusive, flexible, and student-centered academic library environments.

Keywords: academic library, third space, spatial perception, academic engagement, psychosocial well-being, structural equation modeling.

INTRODUCTION

Academic libraries have developed beyond their traditional role as repositories of scholarly materials. They increasingly provide flexible environments for independent study, collaboration, information

discovery, and informal learning. As higher education institutions respond to changing student needs and learning practices, library spaces are expected to support not only access to information but also students' academic participation and broader educational experience (Applegate, 2021; Cox, 2023).

This expanded role can be understood through Oldenburg's (1999) concept of the third place: a setting beyond home and work that enables informal interaction and community life. Although the concept originated outside higher education, it offers a useful lens for examining how academic libraries accommodate activities that extend beyond formal classroom instruction. Quiet study areas, collaborative spaces, and places for rest or informal interaction may allow students to use the library in different ways and develop a sense of connection to the academic community.

Students' experiences of library environments are shaped in part by their perceptions of spatial characteristics, including comfort, lighting, accessibility, furniture, acoustics, safety, and layout. These perceptions may influence whether students choose to use library spaces, how they engage in academic activities, and whether they experience the library as welcoming and supportive. Academic engagement includes students' behavioral, cognitive, and emotional involvement in learning. Psychosocial well-being, in this study, concerns students' self-reported experiences of emotional comfort, belonging, safety, and perceived stress relief in relation to library use.

The reviewed literature demonstrates a growing international and local consensus that academic libraries have evolved beyond their traditional role as repositories of information into multifunctional learning environments that support students' academic, social, and psychological development. Although individual studies have examined various dimensions of library use, four major themes consistently emerge: the library as a third space, spatial perception, academic engagement, and psychosocial well-being.

First, both international and Philippine literature recognize the academic library as an important third space that extends learning beyond formal classroom instruction. International studies describe libraries as learning commons characterized by flexible learning environments, collaborative workspaces, and technology-enhanced facilities that encourage student interaction and knowledge sharing (Applegate, 2021; Cox, 2023). Similarly, Aabø et al. (2022) emphasized that libraries function as inclusive community spaces that support both formal and informal learning while strengthening students' sense of belonging. Philippine studies likewise acknowledge this transformation, although they place greater emphasis on accessibility, environmental comfort, and equitable access to educational resources (Beneyat-Dulagan & Cabonero, 2023). Despite contextual differences, both bodies of literature consistently portray academic libraries as environments that simultaneously facilitate learning, collaboration, and social interaction.

Second, the literature consistently identifies spatial perception as a fundamental determinant of students' library experiences. Environmental characteristics such as lighting, furniture arrangement, acoustics, accessibility, layout, and ambience significantly influence students' satisfaction, productivity, and willingness to utilize library facilities (Khoo et al., 2022; Montgomery, 2021). Song et al. (2024) further demonstrated that well-designed learning environments possess restorative qualities that enhance cognitive functioning while reducing stress. Likewise, Bennett (2023) conceptualized modern libraries as adaptive learning environments that accommodate diverse learning preferences, whereas Prijana et al. (2024) highlighted the role of hybrid learning spaces in promoting collaboration and user satisfaction. Within the Philippine context, Garcia (2024) similarly reported that spatial design positively influences students' motivation and collaborative learning, although local studies generally emphasize basic environmental quality rather than architectural innovation.

Third, substantial evidence supports the positive relationship between library environments and academic engagement. International research consistently demonstrates that supportive library environments encourage greater motivation, concentration, collaborative learning, and effective utilization of educational resources (Alazemi et al., 2023; Cox, 2023; Rowley, 2022; Thomas, 2021). Philippine studies report comparable findings, indicating that students who frequently utilize library resources demonstrate stronger study habits, higher levels of independent learning, and improved academic performance (Bawasanta et al., 2025; Pagalilauan et al., 2023; Santos, 2023). While international literature emphasizes technological integration and collaborative learning systems, local studies focus more heavily on behavioral outcomes such as study habits and resource utilization. Nevertheless, both perspectives consistently support the proposition that supportive library environments foster greater academic engagement.

Fourth, an expanding body of literature highlights the contribution of academic libraries to students' psychosocial well-being. International studies increasingly describe libraries as emotionally restorative environments that promote relaxation, reduce stress, and strengthen students' sense of belonging (Merga, 2021, 2025; Walton, 2021; Wang et al., 2026). Boyd et al. (2022) further demonstrated that biophilic and nature-inspired library designs positively influence students' mental health and cognitive functioning. Philippine studies similarly indicate that supportive library environments reduce academic stress and provide emotional comfort, although structured wellness initiatives remain less common than those reported internationally (Reyes & Dela Cruz, 2022; Samo & Agcito, 2024). These findings collectively reinforce the increasingly recognized role of academic libraries as environments that contribute to both educational success and psychological well-being.

Despite considerable advances in the literature, several important research gaps remain. Existing studies have largely examined spatial perception, academic engagement, and psychosocial well-being independently rather than integrating these constructs within a comprehensive structural framework. Empirical investigations using structural equation modeling remain limited in Philippine higher education, and few studies have examined whether academic engagement statistically mediates the relationship between students' perceptions of library environments and psychosocial well-being.

Accordingly, this study examines the relationships among students' spatial perceptions of academic library environments, academic engagement, and psychosocial well-being. Specifically, it tests whether spatial perception is associated with academic engagement and psychosocial well-being, whether academic engagement is associated with psychosocial well-being, and whether academic engagement mediates the relationship between spatial perception and psychosocial well-being. The study aims to contribute evidence that may inform library space planning and student-centered services in higher education. Given the cross-sectional design, the hypothesized paths are interpreted as statistical relationships rather than proof of causal effects.

THEORETICAL FRAMEWORK

This study draws on three complementary perspectives: Oldenburg's Third Place Theory, Astin's Theory of Student Involvement, and Seligman's PERMA Model. Together, these perspectives provide a conceptual basis for examining how students perceive academic library spaces, how those perceptions relate to academic engagement, and how both constructs are associated with psychosocial well-being.

Oldenburg's (1999) concept of the third place frames the academic library as a setting that can support informal interaction and community alongside formal learning. In this study, the concept helps explain

why students may value library spaces for quiet study, group work, relaxation, and a sense of belonging. The concept is used as an interpretive lens; the study does not directly measure every defining feature of a third place.

Astin's (1984) Theory of Student Involvement explains the mechanism through which spatial perception influences students' academic experiences. Astin suggests that student learning and development are largely determined by the quality and quantity of students' physical and psychological investment in educational activities. Students who perceive the library as comfortable, accessible, and supportive are more likely to devote greater effort to studying, utilizing library resources, collaborating with peers, and participating in academically meaningful activities. Thus, academic engagement represents an important behavioral outcome arising from positive perceptions of the library environment.

Seligman's (2011) PERMA Model provides the theoretical basis for understanding psychosocial well-being. The model conceptualizes well-being through five interconnected dimensions: Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment. These dimensions are reflected in students' experiences within supportive library environments where they feel relaxed, emotionally secure, socially connected, academically productive, and psychologically fulfilled. Accordingly, the library functions not only as a learning environment but also as a setting that promotes positive psychological functioning.

Taken together, these three theories provide a coherent explanation of the proposed structural model. Oldenburg's Third Place Theory explains the environmental characteristics of the academic library, Astin's Theory of Student Involvement explains how positive spatial perceptions promote academic engagement, and Seligman's PERMA Model explains how supportive environments and meaningful engagement contribute to psychosocial well-being. This integrated theoretical framework therefore supports the hypothesized direct and indirect relationships among spatial perception, academic engagement, and psychosocial well-being examined in the present study.

METHODOLOGY

The study employed a quantitative descriptive-correlational research design using structural equation modeling (SEM) to examine the relationships among students' spatial perception of the library as a third space, academic engagement, and psychosocial well-being. The descriptive component summarized the respondents' profiles and perceptions of the study variables, while the correlational component examined the associations among the latent constructs. SEM was used to assess the measurement and structural models and estimate the hypothesized direct and indirect effects, particularly the mediating role of academic engagement in the relationship between spatial perception and psychosocial well-being. The study was conducted among 157 higher education students from selected public and private colleges and universities in the MIMAROPA and CALABARZON regions of the Philippines. Purposive sampling was employed, with eligibility based on having used the institutional library during the current academic year. Data were collected through a researcher-developed online questionnaire comprising four sections: respondents' demographic characteristics and library-use profiles; spatial perception of the library as a third space; academic engagement; and psychosocial well-being. Each of the three main constructs was assessed using ten indicators, with responses measured on a four-point Likert scale ranging from 1 (Strongly Disagree) to 4 (Strongly Agree).

To establish the quality of the research instrument, the questionnaire underwent expert validation to assess content elevance, clarity, organization, and alignment with the study objectives. A pilot test involving students excluded from the final sample was also conducted to evaluate clarity and internal consistency.

Reliability was assessed using Cronbach's alpha, while confirmatory factor analysis (CFA), standardized factor loadings, composite reliability (CR), and average variance extracted (AVE) were used to evaluate construct validity and internal consistency. Prior to data collection, permission was obtained from the participating institutions, and respondents were provided with an informed consent statement explaining the study's objectives, voluntary participation, confidentiality of responses, and right to withdraw without penalty. The study adhered to ethical principles for research involving human participants, and the collected data were intended solely for academic and research purposes. Completed questionnaires were screened according to the inclusion criteria before statistical analysis. However, the reported responses indicating that some participants had never used the library should be reconciled with the eligibility requirement. Moreover, because the data were cross-sectional, the findings establish neither temporal precedence nor causal relationships among the variables. The adequacy of the sample for SEM should also be justified in relation to model complexity, estimator selection, distributional assumptions, and parameter stability, with the specific sample-size rationale or power analysis reported where available.

RESULTS AND DISCUSSION

1. Demographic Characteristics of Respondents

Table 1 shows that most respondents were aged 17–19 years old (45.22%) and 20–22 years old (42.04%), indicating that the sample was primarily composed of students within the usual undergraduate age range. Female respondents accounted for 58.60%, male respondents for 38.22%, and 3.18% preferred not to state their gender. Most respondents came from public institutions (85.99%), while 12.74% came from private institutions and 1.27% did not indicate institution type. The demographic profile suggests that the respondents are predominantly young, mainly female, and largely enrolled in public institutions. These characteristics provide a relevant context for analyzing how students perceive the academic library as a third space and how it relates to their academic engagement and psychosocial well-being.

N = 157

Table 1. Demographic Profile of Respondents

Profile Category	Frequency	Percentage (%)
17-19 years old	71	45.22
20-22 years old	66	42.04
23-25 years old	12	7.64
26 years old and above	8	5.10
Total	157	100.00
Male	60	38.22
Female	92	58.60
Prefer not to say	5	3.18
Total	157	100.00
Private institution	20	12.74
Public institution	135	85.99
Missing/Not indicated	2	1.27

2. Library Utilization Patterns

Table 2. Frequency of Library Use

Frequency of Use	Frequency	Percentage (%)	Rank
Rarely	72	45.86	1
2-3 times/week	38	24.20	2
Weekly	27	17.20	3
Daily	16	10.19	4
Never	4	2.55	5

As shown in Table 2, the largest group of respondents reported rare library use (45.86%). However, a substantial portion still used the library regularly: 24.20% visited two to three times per week, 17.20% visited weekly, and 10.19% visited daily. Only 2.55% reported never using the library. This indicates that although library use was not frequent for all students, the library still maintained a meaningful base of regular users.

Table 3. Average Time Spent in the Library per Visit

Time Spent per Visit	Frequency	Percentage (%)
Less than 1 hour	70	44.59
1–2 hours	66	42.04
3–4 hours	13	8.28
More than 4 hours	8	5.10

As shown in Table 3 most respondents used the library for short to moderate periods. A total of 44.59% stayed for less than one hour, while 42.04% stayed for one to two hours. Smaller groups stayed for three to four hours (8.28%) or more than four hours (5.10%). These findings suggest that the library supports both quick academic visits and extended study sessions.

Table 4. Primary Purpose of Library Use (Multiple Responses)

Purpose of Library Use	Frequency	Percentage (%)
Studying/Reviewing	135	85.99
Relaxation	77	49.04
Group Work	64	40.76
Research/Assignments	60	38.22
Internet/Computer Use	24	15.29

As gleaned in Table 4, studying and reviewing remained the leading purpose of library use (85.99%), confirming the library's central academic function. However, relaxation was also frequently selected (49.04%), followed by group work (40.76%) and research or assignments (38.22%). Because respondents were allowed to select multiple purposes, percentages exceed 100%. The findings support the idea that students use the library not only for academic requirements but also for rest, collaboration, and informal support.

Table 5. Preferred Areas in the Library (Multiple Responses)		
Preferred Area	**Frequency**	**Percentage (%)**
Silent/Individual Study Area	126	80.25
Group Study/Discussion Area	75	47.77
Lounge/Relaxation Area	46	29.30
Reading Area	35	22.29
Computer/Multimedia Area	19	12.10

As indicated in Table 5, the silent or individual study area was the most preferred space (80.25%), showing that students strongly value quiet areas for concentration. Group study or discussion areas ranked second (47.77%), indicating a continued need for collaborative spaces. Lounge and relaxation areas (29.30%) further support the third-space role of the library because students also value comfort and informal use.

3. Descriptive Statistics and Reliability of Constructs

Table 6. Descriptive Statistics and Reliability of Major Constructs				
Construct	**Mean**	**SD**	**Cronbach's Alpha**	**Interpretation**
Spatial Perception	3.38	0.62	0.957	Very High/Strongly Agree
Academic Engagement	3.26	0.64	0.956	Very High/Strongly Agree
Psychosocial Well-being	3.35	0.60	0.965	Very High/Strongly Agree
Overall Scale	-	-	**0.981**	**Excellent internal consistency**

The descriptive statistics in Table 6 indicates generally positive perceptions of the academic library across all major constructs. Spatial perception obtained a mean score of 3.38 (SD = 0.62), academic engagement obtained a mean of 3.26 (SD = 0.64), and psychosocial well-being obtained a mean of 3.35 (SD = 0.60). These results indicate that respondents generally agreed that the library provides supportive physical conditions, promotes academic involvement, and contributes positively to their overall well-being. The reliability analysis also demonstrates excellent internal consistency among the measurement scales. Cronbach's alpha values for spatial perception (0.957), academic engagement (0.956), and psychosocial well-being (0.965) exceeded the recommended threshold, while the overall scale reliability reached 0.981. These findings indicate that the instrument consistently measured the intended constructs and provided a reliable basis for structural equation modeling analysis.

4. Measurement Model Assessment

The measurement model results in Table 7 confirmed the validity and reliability of the latent constructs. All standardized factor loadings exceeded 0.70, with spatial perception ranging from 0.715 to 0.931, academic engagement from 0.778 to 0.886, and psychosocial well-being from 0.817 to 0.884. These values indicate that the observed indicators strongly represented their respective constructs. Furthermore, composite reliability values were above acceptable levels, with values of 0.958 for spatial perception, 0.956 for academic engagement, and 0.966 for psychosocial well-being. The average variance extracted (AVE) values also exceeded the recommended minimum of 0.50, confirming adequate convergent

validity. Therefore, the measurement model demonstrated that the constructs were appropriately represented and suitable for further structural analysis.

Table 7. Measurement Model Summary

Construct	Standardized Loading Range	Composite Reliability	AVE	Interpretation
Spatial Perception	.715–.931	.958	.697	Acceptable
Academic Engagement	.778–.886	.956	.686	Acceptable
Psychosocial Well-being	.817–.884	.966	.738	Acceptable

5. Structural Model and Hypothesis Testing

Table 8. Structural Model Fit Indices

Model Fit Index	Value
χ^2	878.73
df	402
CFI	0.908
TLI	0.901
RMSEA	0.087
SRMR	0.040

The structural model in Table 8 demonstrated acceptable model fit. The comparative fit index (CFI = 0.908) and Tucker–Lewis index (TLI = 0.901) exceeded the recommended 0.90 threshold, while the standardized root mean square residual (SRMR = 0.040) indicated good model adequacy. Although the RMSEA value (0.087) was slightly above the preferred cutoff, the overall model was considered acceptable, suggesting that the proposed relationships among spatial perception, academic engagement, and psychosocial well-being were adequately represented.

Table 9. SEM Path and Mediation Results

Path/Effect	β / Effect Size	Significance / CI	Decision
Spatial Perception → Academic Engagement	.853	< .001	Supported
Spatial Perception → Psychosocial Well-being	.303	< .001	Supported
Academic Engagement → Psychosocial Well-being	.638	< .001	Supported
Indirect Effect: Spatial Perception → Academic Engagement → Psychosocial Well-being	.483	95% CI [.357, .615]	Supported
Total Effect: Spatial Perception → Psychosocial Well-being	.810	95% CI [.709, .915]	Supported

Meanwhile, the structural model results in Table 9 supported all hypothesized relationships. Spatial perception significantly predicted academic engagement ($\beta = 0.853$, $p < 0.001$), indicating that students who viewed the library as accessible, comfortable, safe, and supportive were more likely to demonstrate stronger academic involvement. Spatial perception also had a significant direct effect on psychosocial well-being ($\beta = 0.303$, $p < 0.001$), suggesting that positive environmental experiences within the library contribute directly to students' emotional and psychological outcomes. Moreover, academic engagement significantly influenced psychosocial well-being ($\beta = 0.638$, $p < 0.001$). The indirect effect of spatial perception on psychosocial well-being through academic engagement was significant ($\beta = 0.483$, 95% CI [0.357, 0.615]), demonstrating partial mediation. This indicates that the influence of the library environment on student well-being occurs both directly through supportive spatial experiences and indirectly by encouraging meaningful academic engagement.

Discussion of Results

The findings offer empirical support for understanding the academic library as a multifunctional learning environment rather than solely a place for accessing collections. Respondents reported generally positive perceptions of the library as a third space ($M = 3.38$, $SD = 0.62$), alongside positive ratings of academic engagement ($M = 3.26$, $SD = 0.64$) and psychosocial well-being ($M = 3.35$, $SD = 0.60$). The preference for individual study areas, together with reported use of group-study and relaxation areas, suggests that students value a mix of quiet, collaborative, and informal spaces. This interpretation is consistent with research describing academic libraries as environments that must accommodate different study activities and user needs (Christoffersen et al., 2021; Kim et al., 2021). It also aligns with Song et al.'s (2024) qualitative study, in which students described library environments as potentially restorative when they provided a coherent layout, a variety of spaces, and features that supported concentration and psychological distance from everyday pressures. These parallels strengthen the practical relevance of the present findings, although differences in institutional context and research design mean that the studies should not be treated as directly equivalent.

Spatial perception was strongly and positively associated with academic engagement ($\beta = .853$, $p < .001$). Within the proposed model, this was the largest structural path, suggesting that students who viewed the library environment more favorably also tended to report stronger academic involvement. This pattern is compatible with Astin's (1984) theory of student involvement, which emphasizes the physical and psychological energy students invest in their educational experience, and with Kuh's (2009) account of student engagement as a central dimension of educational quality. A library that provides comfortable and accessible facilities, appropriate furnishings, and spaces for both individual study and collaborative learning may better accommodate students' diverse academic needs. Research has identified factors such as noise levels, available space, furnishing comfort, cleanliness, and environmental conditions as important considerations in students' selection and use of library spaces (Applegate, 2009). Similarly, studies of academic library learning environments emphasize the need to balance quiet study areas with collaborative spaces and to align spatial design with students' activities and preferences (DeFrain & Hong, 2020).A library that is comfortable, accessible, appropriately equipped, and supportive of both focused and collaborative work may help students sustain attention and make use of learning resources.Research on academic library environments has emphasized that effective learning-space design should reflect students' varied activities, spatial preferences, and functional needs, including individual study, collaborative learning, and social interaction (Wu et al., 2021). Nevertheless, the coefficient should be

interpreted as a strong association in this sample, not proof that spatial improvements necessarily cause engagement to increase. The cross-sectional, self-reported design does not establish temporal order, and the magnitude of the relationship should be considered alongside the instrument's item content and the model's overall fit.

Spatial perception also showed a positive direct association with psychosocial well-being ($\beta = .303$, $p < .001$). This finding suggests that students who perceived the library more positively also tended to report more favorable well-being experiences. Possible explanations include comfort, perceived safety, accessibility, and the opportunity to study in an environment that feels orderly and welcoming; however, the present analysis does not isolate the effects of individual design features. The interpretation is consistent with Bladek's (2021) review of academic-library well-being initiatives, which describes how library spaces, collections, and services can contribute to broader student-support efforts. It is also consistent with Song et al. (2024), whose participants described library spaces as having restorative potential. Together, these studies provide a plausible context for interpreting the association found here, but they do not establish that the library independently improves mental health. The current outcome is self-reported psychosocial well-being, and libraries should be understood as one part of a wider campus support system rather than a substitute for professional mental-health services.

Academic engagement was positively associated with psychosocial well-being ($\beta = .638$, $p < .001$). This result indicates that students reporting greater academic engagement also tended to report better psychosocial well-being within the specified model. One possible interpretation is that purposeful study, productive use of resources, and opportunities to make progress on academic tasks may coincide with feelings of competence, accomplishment, and satisfaction. This interpretation is conceptually compatible with Astin's (1984) emphasis on student involvement and with the broader view that well-being and educational experience are interconnected. However, the questionnaire and cross-sectional design do not establish the specific psychological processes involved. It is also possible that students with greater well-being are better able to engage academically, or that other factors—such as academic support, workload, social support, or institutional climate—contribute to both outcomes. Future research should test these alternatives using longitudinal data and measures designed to distinguish the dimensions of engagement and well-being.

The indirect effect of spatial perception on psychosocial well-being through academic engagement was positive and statistically significant ($\beta = .483$, 95% CI [.357, .615]); the reported total effect was .810 (95% CI [.709, .915]). Because the direct path from spatial perception to psychosocial well-being remained significant, the results are consistent with partial statistical mediation in the proposed model. The indirect effect is substantively important because it suggests that the relationship between perceived library space and well-being may be linked not only to students' immediate experience of the environment but also to their reported academic engagement. This pattern offers a useful basis for further investigation of the library as a learning environment that connects spatial experience with academic and psychosocial outcomes. Nonetheless, mediation estimated from cross-sectional data cannot establish a causal process; temporal precedence and alternative explanations remain unresolved. The result should therefore be described as an indirect association consistent with the hypothesized mediation model rather than conclusive evidence that engagement transmits a causal effect.

The structural model's fit indices also warrant a balanced interpretation. CFI = .908 and TLI = .901 were just above the commonly used .90 reference point, and SRMR = .040 indicated a comparatively small standardized residual. However, RMSEA = .087 was higher than values often associated with close fit.

Hu and Bentler (1999) cautioned against relying on a single fit index and recommended evaluating combinations of indices, while also noting that cutoffs are guidelines rather than universal rules. Accordingly, the model should not be characterized as demonstrating uniformly strong fit. The indices provide mixed evidence: some suggest an adequate approximation, whereas RMSEA signals possible residual misfit. Reporting the estimator, confidence interval for RMSEA, chi-square/df ratio, distributional checks, and any model modifications would help readers judge the robustness of the proposed relationships. The sample size (N = 157) and the complexity of the model should also be considered when interpreting parameter stability and fit.

Taken together, the findings support the value of planning academic libraries around students' varied learning activities and experiences. They suggest that space planning, academic engagement, and psychosocial well-being are meaningfully associated in this sample, while also highlighting the need for cautious interpretation. For practice, libraries may use student feedback and space-use evidence to balance quiet study areas with collaborative and informal zones, and to assess whether spaces are accessible, comfortable, safe, and welcoming. These recommendations are consistent with research calling for library learning spaces to be evaluated in relation to users' activities and needs (Christoffersen et al., 2021; Kim et al., 2021). For research, the proposed model should be tested with larger and more diverse samples, more complete psychometric reporting, and longitudinal or mixed-methods designs. Such work could clarify whether specific spatial characteristics are associated with distinct dimensions of engagement and well-being and whether the observed relationships remain stable across institutions and student groups.

LIMITATIONS OF THE STUDY

Several limitations should be considered when interpreting the findings. First, the cross-sectional design captures respondents' perceptions at one point in time and does not establish temporal order or causality among spatial perception, academic engagement, and psychosocial well-being. Second, the measures were self-reported and may be affected by recall, response, or social-desirability bias. Third, purposive sampling and the predominance of respondents from public higher education institutions limit the extent to which the findings can be generalized to other student populations or institutional contexts. The sample of 157 respondents also warrants cautious interpretation in view of the complexity of the SEM model; the manuscript should report the estimator, distributional checks, and sample-size rationale to help readers assess model stability. Fourth, the researcher-developed instrument requires transparent reporting of its development, expert review, pilot testing, and psychometric assessment. Finally, the reported inclusion criterion—that respondents had used the library during the current academic year—appears inconsistent with the four respondents who reported never using the library. This discrepancy should be resolved before submission. Future studies could use probability-based or more diverse sampling, longitudinal or multi-wave designs, and additional qualitative data to investigate how students experience specific library features and how these experiences relate to engagement and well-being over time.

CONCLUSIONS AND IMPLICATIONS OF THE STUDY

This study examined the relationships among students' perceptions of academic library spaces, academic engagement, and psychosocial well-being. Respondents reported generally positive perceptions across the three constructs. The SEM results indicated positive associations between spatial perception and academic engagement, between spatial perception and psychosocial well-being, and between academic engagement

and psychosocial well-being. The indirect effect through academic engagement was also statistically significant, consistent with partial mediation in the proposed model.

The findings support viewing academic libraries as more than repositories of information: students may experience them as environments that accommodate focused study, collaboration, relaxation, and belonging. Nevertheless, the results should be interpreted as associations within this sample rather than causal effects. The model-fit indices were mixed, particularly in relation to RMSEA, and should be discussed transparently. The study's contribution is therefore an empirical examination of the interrelationships among library spatial perception, academic engagement, and perceived psychosocial well-being in a Philippine higher education context.

The findings suggest several practical considerations for academic library planning. Libraries may benefit from balancing quiet individual-study areas with spaces for group work and informal use, reflecting respondents' stated preferences for both individual and collaborative environments. Space planning should consider accessibility, comfort, lighting, acoustics, safety, and flexible furniture arrangements, while evaluating these features through systematic user feedback rather than assuming that one design suits all students.

Higher education institutions may also consider the library as one component of a broader student-support ecosystem. Library services and spaces can be planned to support study, collaboration, and a sense of welcome; however, claims about mental-health outcomes should be made cautiously and should not substitute for professional student support services. At the policy level, institutional planning and library assessment may incorporate both functional measures—such as space use and resource access—and student-reported experiences of comfort, inclusion, and engagement.

Future research should test the model with larger and more diverse samples, report full measurement-model and structural-model diagnostics, and examine whether findings vary by institution type, year level, frequency of library use, or preferred study area. Longitudinal research and qualitative interviews could further clarify how students' experiences of specific library features relate to academic engagement and psychosocial well-being. Researchers should also consider alternative explanations and potential confounding variables before making causal claims.

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