

Campus cultural landscapes and mental health: The mediating role of place attachment

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ARTICLE INFO	ABSTRACT
<i>Article history:</i> Received March 25, 2026 Received in revised form May 18, 2026 Accepted July 22, 2026 Available online September 01, 2026 <i>Keywords:</i> Campus environmental Landscape cultural quality Mental health Place attachment *Corresponding author: Massoomeh Hedayati Marzbali School of Housing, Building and Planning, Universiti Sains Malaysia Email: hedayati@usm.my ORCID: https://orcid.org/0000-0003-3213-8090	<i>University campus environments are critical contextual determinants of students' mental health. However, existing research has largely privileged nature-based restorative frameworks, particularly Attention Restoration Theory and Stress Recovery Theory, leaving the psychological significance of culturally embedded spatial meanings under-theorized in higher education contexts. Although cultural landscapes have been discussed in planning scholarship, their structural relationships with place attachment and mental health remain insufficiently examined. This research investigates the structural associations among perceived campus cultural landscape quality, place attachment, and students' mental health using survey data from a research-intensive university in Malaysia. Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to test the proposed relationships. The findings indicate that perceived cultural landscape quality positively predicts both place attachment and mental health, while place attachment is also positively associated with mental health. By integrating Cultural Continuity Theory with Place Attachment Theory, this research advances a meaning-oriented perspective on campus environments, extending dominant restorative paradigms beyond biophysical attributes. The results highlight the role of culturally encoded spatial meanings in strengthening affective bonds and promoting psychological well-being, offering empirical implications for culturally responsive campus planning and mental health promotion.</i>

Introduction

University campuses function as complex socio-cultural environments that shape students' psychological experiences, identity development, and well-being (H. Li, Du, and Chow 2024; Moussa 2021). While prior research has demonstrated the restorative and emotional benefits of natural attributes such as green spaces and spatial design (Pang, Jia, and Zhang 2025; Salehi Kousalari et al. 2025), campuses also operate as cultural landscapes that embed

collective memory, symbolic meaning, and institutional identity within everyday spatial experience (Pang, Jia, and Zhang 2025). As tangible carriers of cultural continuity and identity expression (Ahn and Davis 2023; Xiong 2021), campus cultural landscapes contribute not only to aesthetic perception but also to students' processes of psychological integration and sense of belonging.

Although environmental psychology has consistently demonstrated associations between environmental quality and mental health (Zamri

and Ahmad 2025), dominant paradigms grounded in restorative environment theory and environmental preference theory have primarily operationalized campus landscape quality in biophysical terms (Ting and Bahauddin 2022), such as naturalness, greenness, and visual aesthetics (Deng and Lee 2025; Salehi Kousalari et al. 2025). This emphasis on physical attributes has comparatively marginalized the cultural and identity-based dimensions of spatial experience (Aghabozorgi et al. 2025), leaving the psychological mechanisms through which campus cultural landscapes influence well-being insufficiently articulated (Aghabozorgi et al. 2025; J. Zhang et al. 2025). Cultural Continuity Theory, which foregrounds sustained engagement with cultural symbols as a basis for identity stability and psychological coherence (Cobb, Schwartz, and Martinez 2026), provides a conceptual foundation for extending existing models beyond nature-centered interpretations. Furthermore, affective processes are widely recognized as central pathways linking environmental experience to psychological outcomes (Gifford 2014; Stokols 1995), and Place Attachment Theory conceptualizes emotional bonds with place as integral to mental health (Scannell and Gifford 2010; Zahnow 2024). Yet the role of culturally embedded meanings in shaping place attachment remains under-integrated in current empirical frameworks (Chang et al. 2025).

Methodologically, research on campus cultural landscapes has been dominated by planning analyses and design-oriented discourse, with limited systematic quantitative validation (Bai 2017; Su, Li, and Li 2015; Yan 2015). Although recent work has incorporated surveys and eye-tracking to examine perceptual and aesthetic responses (Pang, Jia, and Zhang 2025), these approaches remain confined to visual and cognitive dimensions. A structural modeling framework explicitly linking cultural landscape variables to mental health outcomes remains underdeveloped.

Taken together, campus mental health scholarship remains largely anchored in restorative environmental paradigms that privilege biophysical attributes, leaving culturally embedded spatial meanings comparatively under-theorized. Although Cultural Continuity Theory underscores the role of cultural symbols in sustaining identity stability and well-being, it has yet to be spatially operationalized within campus-

built environment models or empirically integrated into place attachment frameworks. To address these gaps, this research integrates Cultural Continuity Theory with Place Attachment Theory, reconceptualizing place attachment as a core psychological mechanism linking cultural landscape quality to mental health. Situated within a rapidly urbanizing Southeast Asian public university, this study is positioned in a context where Malaysia's "hybrid" higher education system reflects the convergence of Western academic traditions and local cultural heritage (Lee, Wan, and Sirat 2017). Yet this institutional pluralism has not consistently translated into a coherent cultural presence within campus spatial environments (Kaur Mehar Singh and Xue 2025). Moreover, although Malay cultural landscapes retain an established symbolic repertoire, their expressive continuity has weakened in contemporary design practice (Hussain et al. 2020). Against this backdrop, embedding Cultural Continuity Theory within campus-built environment research facilitates a move beyond dominant ART- and SRT-informed nature-based paradigms by foregrounding cultural landscape quality within a mental health framework. This perspective also provides practical implications for culturally responsive campus planning and spatial design strategies aimed at strengthening students' affective bonds and psychological well-being.

Literature review

Theoretical background

Cultural Continuity Theory conceptualizes identity stability as sustained through the transmission of shared symbols, values, and historical narratives (Cobb, Schwartz, and Martinez 2026). Framed as an active psychological process, continuity anchors self-concept and promotes existential coherence. Empirical evidence links stronger cultural continuity to lower suicide and psychological distress (Chandler and Lalonde 1998) and associates integrated cultural identity with greater psychological adaptation and well-being (Phinney et al. 2001), whereas disruption relates to identity fragmentation and emotional strain (Kirmayer, Simpson, and Cargo 2003). Despite its relevance to identity and well-being, the theory has rarely been spatialized, leaving unclear how culturally embedded environmental meanings translate into individual psychological outcomes.

Place Attachment Theory provides a potential mechanism for this translation by conceptualizing attachment as the internalization of spatial meaning through enduring emotional bonds, particularly via place identity (M. Xu et al. 2015). Integrating these perspectives, this research positions Cultural Continuity Theory as the foundational account of cultural meaning and identity persistence, with place attachment operating as the psychological pathway linking campus cultural landscapes to mental health (Cobb, Schwartz, and Martinez 2026; M. Xu et al. 2015).

Hypothesis development

Cultural landscape quality and mental health

Cultural landscapes are commonly conceptualized as spatial configurations through which social practices, symbolic systems, and collective meanings become materially embedded within particular environmental contexts (Y. Xu 2024). Within human geography, landscape scholarship has progressively shifted from viewing landscape as a purely physical form to understanding it as a socio-cultural construct that embodies institutional values, historical narratives, and identity expressions (Mels 2019; Panagiotopoulos et al. 2023). In university settings, campus cultural landscapes encompass the material environments and spatial atmospheres that reflect institutional spirit, historical traditions, and aesthetic orientations (MENG et al. 2025). These landscapes include plazas, vegetation, water features, architectural elements, sculptures, paving systems, and signage, while also embodying a spatial logic rooted in campus culture and local cultural traditions (Wang 2019).

Empirical research has indicated that campus spaces characterized by cultural-aesthetic attributes are positively associated with stress reduction and enhanced well-being among students (Pang, Jia, and Zhang 2025). However, existing studies examining campus environments and mental health have predominantly operationalized landscape quality in terms of biophysical indicators such as naturalness and visual aesthetics (Deng and Lee 2025; Salehi Kousalari et al. 2025), with comparatively limited attention to cultural symbolism and identity-related dimensions. Although campus cultural landscapes are frequently described as carriers of institutional spirit, their role as independent predictors of students' mental health has not been

systematically examined within structured empirical models. In particular, the pathways through which cultural expression translates into psychological outcomes remain insufficiently specified (Bai 2017; Zou et al. 2025). Based on this theoretical and empirical foundation, the following hypothesis is proposed:

H1: Cultural landscape quality is positively associated with students' mental health.

Place dependency and place identity

Place attachment is defined as the affective and cognitive bond that individuals establish with specific environments and is widely conceptualized as a central mechanism through which environmental meanings become incorporated into self-structure (Scannell and Gifford 2010). The construct is commonly operationalized along two dimensions: place dependence and place identity (Williams & Vaske 2003). In higher education contexts, place dependence reflects the perceived functional indispensability of a campus in supporting academic development, resource access, and spatial adequacy relative to alternative settings (Shah Khaidzir and Ahmad Kamal 2023; Sun and Maliki 2015). Place identity denotes the degree to which the university environment is integrated into an individual's self-concept (Ling, Marzbali, and Yang 2024; Shah Khaidzir and Ahmad Kamal 2023).

Cultural landscape quality is theoretically positioned as a contextual antecedent of both dimensions. By embedding historical narratives, symbolic representations, and culturally meaningful spatial configurations within campus environments, cultural landscapes generate distinct experiential and functional affordances that may strengthen perceived dependence on place (Shah Khaidzir and Ahmad Kamal 2023; Sun and Maliki 2015). Empirical evidence indicates that commemorative landscapes and culturally inscribed spatial elements are associated with heightened emotional attachment and environmental engagement among university students (R. Zhang, Duan, and Zheng 2024). Furthermore, architectural forms, public art, signage systems, and other culturally expressive spatial features convey institutional and local identity cues that facilitate the internalization of place-based meaning (Cheng et al. 2020; M. Li et al. 2025). Evidence from Malaysian universities further demonstrates that symbolic public sculptures contribute to campus identity construction and institutional value representation

(Ghani et al. 2023). Accordingly, the following hypotheses are proposed:

H2: Cultural landscape quality is positively associated with place dependence.

H3: Cultural landscape quality is positively associated with place identity.

Within campus environments, both dimensions of place attachment are theoretically linked to psychological well-being. Place dependence, as an expression of functional reliance and environmental indispensability, has been associated with positive evaluations of campus experience and health outcomes. Empirical evidence indicates that greater campus use and exposure strengthen place dependence and are positively related to self-rated physical health and overall campus life quality among university students (Mousighichi, Mousavi Samimi, and Mousapour 2024). Place identity, reflecting the incorporation of the campus environment into self-concept, has likewise been linked to enhanced psychological well-being. Empirical findings from the United States demonstrate that stronger place identity is positively associated with higher levels of student psychological well-being (Meagher 2020). Accordingly, the following hypotheses are proposed:

H4: Place dependence is positively associated with students' mental health.

H5: Place identity is positively associated with students' mental health.

Within the multidimensional structure of place attachment, place identity is frequently conceptualized as a more advanced or internalized form of person–place relationship (Marcouyeux and Fleury-Bahi 2011; Shah Khaidzir and Ahmad Kamal 2023). In contrast, place dependence reflects functional attachment grounded in the perceived utility and irreplaceability of a specific environment. Prior scholarship examining campus attachment and university identification suggests that place identity may emerge from accumulated functional and affective ties, representing a process through which sustained dependence evolves into self-identification with place (Sari and Bükün 2023). This hierarchical interpretation implies that functional reliance on campus environments may precede and contribute to the development of place identity. Accordingly, the following hypothesis is proposed:

H6: Place dependence is positively associated with place identity.

Grounded in Cultural Continuity Theory and Place Attachment Theory, this research examines how cultural landscape quality relates to students' mental health through identity-based mechanisms. It proposes that cultural landscape quality enhances well-being via place dependence and place identity, with functional reliance contributing to identity-based attachment and subsequent mental health outcomes. The conceptual framework is presented in figure 1.

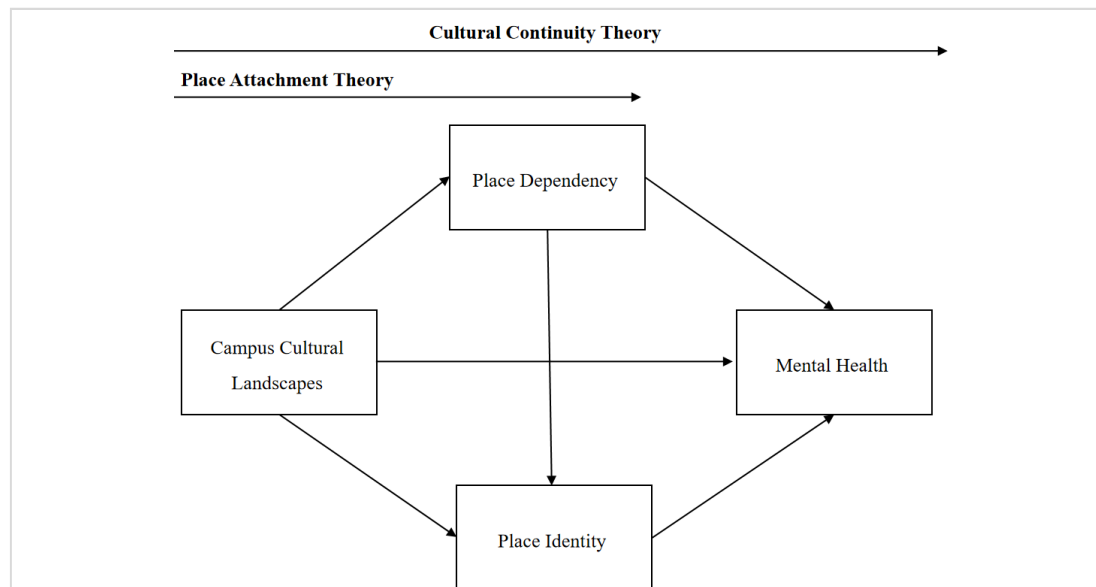


Figure 1. The conceptual pathway between the study variables

Methods

Study context

This study forms part of a broader project grounded in the Stimulus–Organism–Response (SOR) framework examining relationships among campus landscape quality, psychological perceptions, and students' mental health. Data were collected between November and December 2025 at Universiti Sains Malaysia (USM). Rapid urbanization in Penang has imposed ecological and spatial pressures on the region (Safizadeh et al. 2023), affecting campus landscape patterns and environmental quality (Ling, Marzbali, and Yang 2024). As a multicultural public research university with documented psychological stress and variation in campus identification across student groups (Ling, Marzbali, and Yang 2024;

Binti Md Masud Rana et al. 2023; Sun and Maliki 2015), USM provides an appropriate empirical context.

USM occupies approximately 1,029.4 acres and comprises 11 functional zones and 47 subzones (figure 3). A stratified selection strategy based on systematic on-site observation was employed to capture spatial heterogeneity. High-frequency academic, residential, and recreational spaces were identified and evaluated in terms of maintenance, spatial order, naturalness, visibility, and comfort. Sites were categorized into relatively high- and low-quality groups and further classified by behavioral typology (stationary, transitional, buffer). Final locations were selected based on the convergence of functional attributes, landscape quality, and usage patterns.

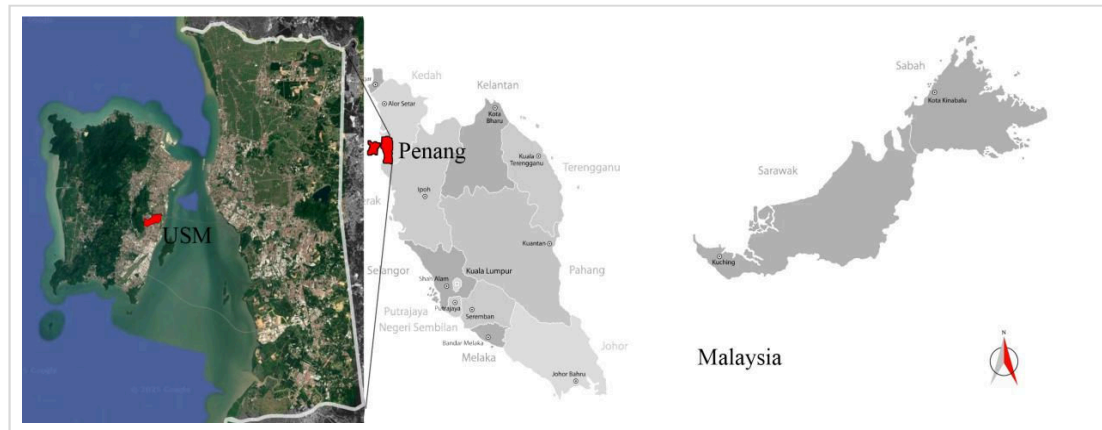


Figure 2. Location map of usm, Malaysia

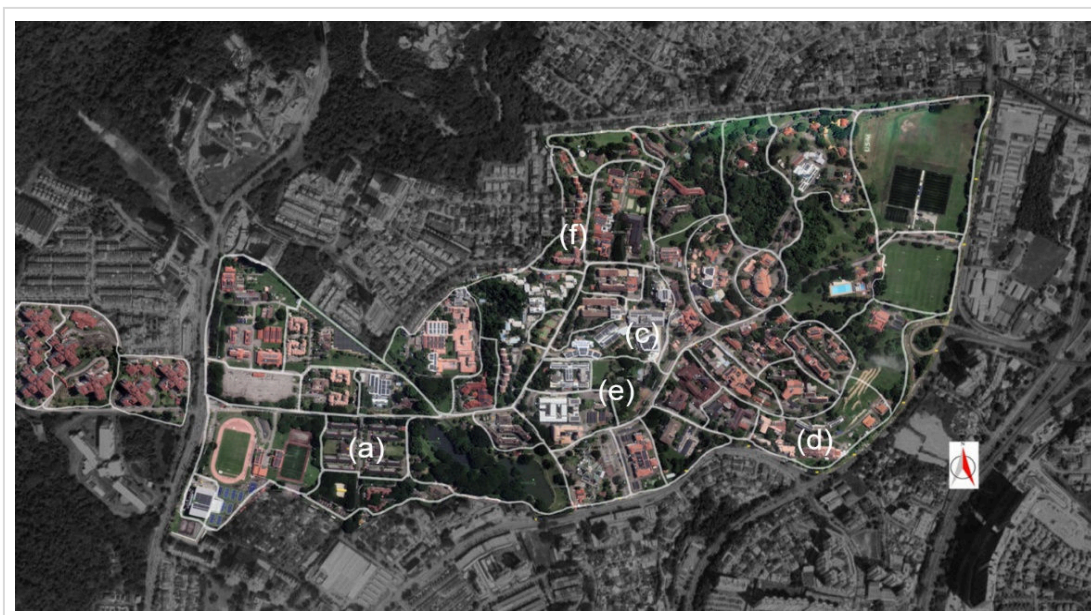


Figure 3. The map of USM main campus

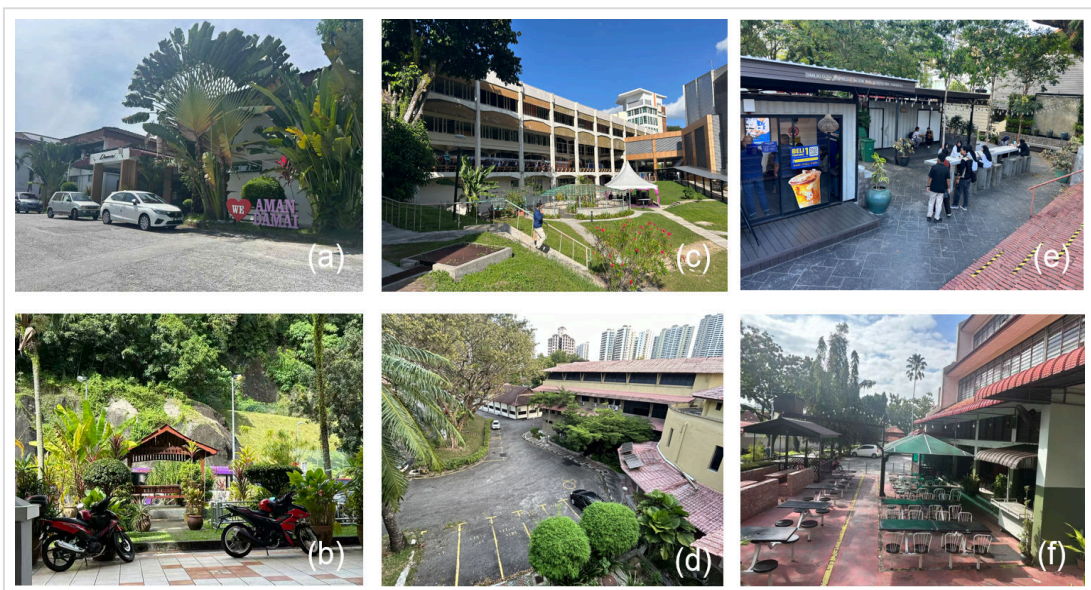


Figure 4. The map of sub-zones

Survey instrument

A structured self-administered questionnaire was developed to assess cultural landscape quality, place dependence, place identity, and mental health. The instrument consisted of two sections. The first collected demographic information, including gender, age, nationality, ethnicity, education level, and monthly income. The second measured the focal constructs of the study. Items assessing cultural landscape quality

were adapted from Liu (2023) and Pang, Jia, and Zhang (2025). Place attachment dimensions (place dependence and place identity) were operationalized based on Hemade et al. (2025) and Omara et al. (2024). Mental health was measured using the scale developed by Kessler et al. (2002). All constructs were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Analytical Techniques

The hypothesized structural relationships were examined using Partial Least Squares Structural Equation Modeling (PLS-SEM). This variance-based approach is appropriate for estimating complex structural models involving multiple latent constructs and does not require strict assumptions of multivariate normality (Hair Jr et al. 2021). The analysis was conducted using SmartPLS 4.0. Path significance was evaluated through non-parametric bootstrapping with 5,000 resamples to generate robust standard errors and confidence intervals (Hair Jr et al. 2021). Model evaluation followed established guidelines for assessing measurement reliability, convergent validity, discriminant validity, and structural path coefficients.

Results and discussion

Respondents' Profile

A total of 278 valid responses. The sample consisted of 29% males and 71% females. Local students accounted for 62.5% of the sample, while international students represented 37.5%. Regarding educational level, 53.8% of respondents were undergraduates and 46.2% were postgraduates. In terms of age distribution, 11.7% were aged 18–20, 35.0% were aged 21–23, 22.3% were aged 24–26, and 30.8% were aged 27 and above.

Measurement model

To ensure the adequacy of the measurement model, both convergent and discriminant validity

were examined following recommended SEM practices (Hair et al. 2021). Convergent validity was assessed by examining indicator loadings, composite reliability (CR), and average variance extracted (AVE). As shown in [table 1](#), all factor loadings range from 0.706 to 0.875, exceeding the recommended threshold of 0.70 and indicating satisfactory indicator reliability.

Internal consistency reliability is supported by Cronbach's alpha values ranging from 0.861 to 0.888, all above the accepted threshold of 0.70 (Hair et al. 2019; Hair et al., 2021). Composite reliability values range from 0.896 to 0.922, further confirming strong construct reliability. In addition, AVE values range from 0.589 to 0.748, exceeding the recommended cut-off value of 0.50 and supporting convergent validity.

Discriminant validity was evaluated using the heterotrait–monotrait ratio (HTMT). As reported in [table 2](#), HTMT values range from 0.400 to 0.736, remaining below the conservative threshold of 0.90, thereby confirming adequate discriminant validity among the constructs (Hair et al. 2021).

The structural model explains 17.8% of the variance in PD, 19.1% in MH, and 44.3% in PI, indicating varying levels of explanatory power across the endogenous constructs. Predictive relevance was confirmed, as all Q^2 values are positive, with values of 0.125 for PD, 0.113 for MH, and 0.323 for PI, suggesting that the model demonstrates acceptable out-of-sample predictive capability. The overall measurement and structural framework adopted in this study is illustrated in [figure 1](#).

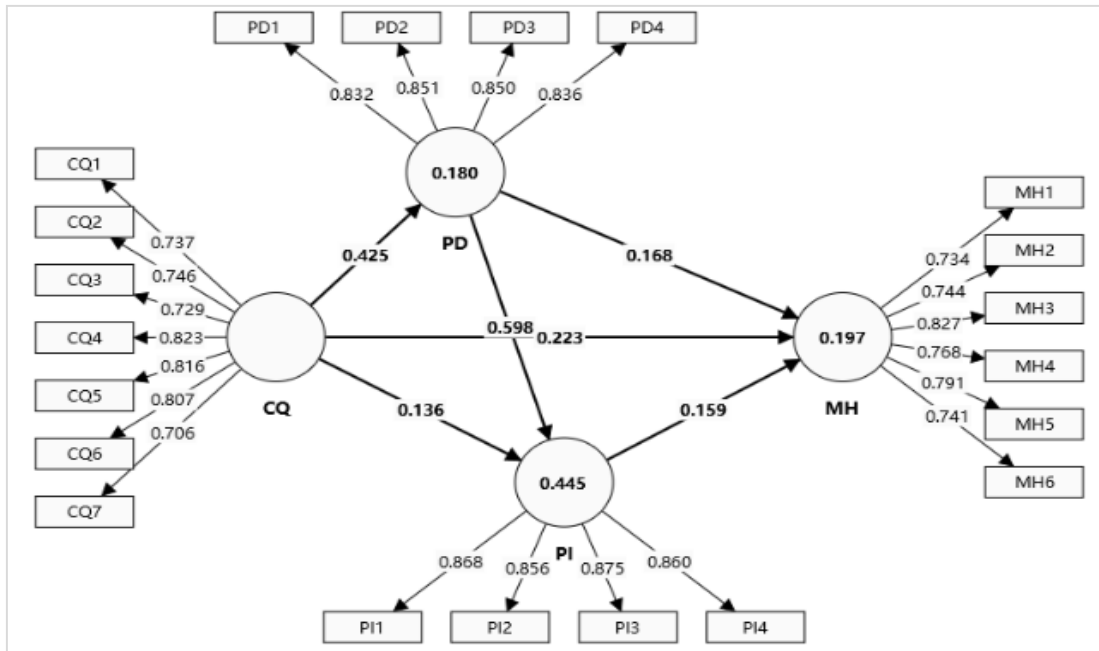


Figure 5. Parameter estimates of the PLS analysis

Table 1. Reliability and convergent validity results

Construct	Item	FL	Cronbach's alpha	CR	AVE
CQ	CQ1	0.737	0.883	0.909	0.589
	CQ2	0.746			
	CQ3	0.729			
	CQ4	0.823			
	CQ5	0.816			
	CQ6	0.807			
	CQ7	0.706			
PD	PD1	0.832	0.864	0.907	0.71
	PD2	0.851			
	PD3	0.85			
	PD4	0.836			
PI	PI1	0.868	0.888	0.922	0.748
	PI2	0.856			
	PI3	0.875			
	PI4	0.86			
MH	MH1	0.832	0.861	0.896	0.59
	MH2	0.85			
	MH3	0.851			
	MH4	0.835			
	MH5	0.832			
	MH6	0.85			

Table 2. Heterotrait-monotrait ratio

	CAQ	MH	PD
CAQ			
MH	0.409		
PD	0.481	0.422	
PI	0.434	0.4	0.736

Structural model assessment

Table 3 presents the results of the structural model assessment. CQ has a significant positive

effect on MH (H1: $\beta = 0.223$, $p < 0.001$). CQ also shows significant positive effects on PD (H2: $\beta = 0.425$, $p < 0.001$) and PI (H3: $\beta = 0.136$, $p = 0.002$). In addition, PD has a significant positive effect on MH (H4: $\beta = 0.168$, $p = 0.008$), while PI positively influences MH (H5: $\beta = 0.159$, $p = 0.015$). PD also significantly affects PI (H6: $\beta = 0.598$, $p < 0.001$). These results indicate that all hypothesised direct relationships are supported.

Table 3. Results of the structural model assessment

	Relationship	β	T	P	f-square	VIF	Decision (Support /Not support)
H1	CQ -> MH	0.223***	3.6	0	0.049	1.253	Support
H2	CQ -> PD	0.425***	9.807	0	0.22	1	Support
H3	CQ -> PI	0.136**	3.064	0.002	0.027	1.22	Support
H4	PD -> MH	0.168**	2.634	0.008	0.019	1.865	Support
H5	PI -> MH	0.159*	2.431	0.015	0.017	1.803	Support
H6	PD -> PI	0.598***	17.00	0	0.529	1.22	Support

Discussions

Key findings

Grounded in Cultural Continuity Theory (Cobb, Schwartz, and Martinez 2026) and Place Attachment Theory (Scannell and Gifford 2010), this study shows that campus cultural landscape quality functions as a meaning-embedded psychological signal shaping students' mental health through identity-based mechanisms. Beyond restorative explanations emphasizing naturalness and greenness (Etopio, Devereux, and Crowder 2019; Deng and Lee 2025; Salehi Kousalari et al. 2025), cultural landscape quality demonstrates a significant direct association with mental health and remains psychologically relevant through culturally encoded symbols and spatial narratives. It is positively associated with place dependence and place identity, reinforcing its role as a carrier of institutional memory and symbolic meaning (Wang 2019; MENG et al. 2025). Consistent with attachment theory and stage-based models (Scannell and Gifford 2010; M. Xu et al. 2015; Marcouyeux and Fleury-Bahi 2011; Sari and Bükün 2023), place dependence contributes to the consolidation of place identity. Together, the findings delineate a "cultural landscape-attachment-health" pathway linking culturally meaningful environments to psychological well-being.

Theoretical and Practical Implications

This study shifts campus mental health research from biophysical restoration toward culturally embedded spatial meaning. While prior scholarship emphasizes ecological attributes (Etopio, Devereux, and Crowder 2019), the findings identify cultural symbolism and spatial narratives as distinct psychological resources, aligning with meaning-centered perspectives (Gifford 2014; Aghabozorgi et al. 2025). By integrating Cultural Continuity Theory and Place Attachment Theory (Cobb, Schwartz, and Martinez 2026; Scannell and Gifford 2010; M. Xu

et al. 2015), the study advances a "cultural meaning-identity-mental health" framework extending nature-centered paradigms. Practically, campus planning should prioritize symbolic continuity and identity-relevant spatial cues, particularly in high-exposure zones, to strengthen attachment and support psychological stability.

Limitations

The single-institution sample limits generalizability, calling for cross-cultural validation. Cultural landscape quality was treated as an aggregate construct; future research should differentiate its dimensions and extend analysis to behavioral engagement patterns.

Conclusions

Grounded in Cultural Continuity Theory and Place Attachment Theory, this study reconceptualizes the functional role of campus cultural landscapes in university contexts. The findings indicate that the influence of cultural landscape quality on students' mental health is realized through identity-based mechanisms specifically place dependence and place identity rather than through physical form or visual aesthetics alone. Campus cultural landscapes thus operate as meaning-based infrastructures that facilitate identity integration and emotional stability rather than serving merely decorative or representational purposes. These results reframe the logic through which campus environments contribute to psychological well-being. Whereas prior scholarship has emphasized environmental stimulation or aesthetic enhancement, the present findings highlight the internalization of cultural meaning as the core pathway linking space and mental health. Psychological benefits emerge when campus environments sustain cultural continuity and affirm identity through everyday spatial engagement. Practically, this perspective

calls for a shift in campus planning priorities. Cultural embedding should be treated as a structural strategy rather than an ornamental addition. The spatial integration of historical narratives, regional symbolism, and identity expression represents a long-term investment in student psychological well-being. Overall, this study elevates campus cultural landscapes from physical environmental elements to systems of psychological meaning, clarifying their structural role in mental health formation and offering a theoretical foundation for culturally responsive campus design.

References

- Aghabozorgi, Koorosh, Alexander van der Jagt, Simon Bell, and Harry Smith. 2025. "The Role of University Campus Landscape Characteristics in Students' Mental Health." *Urban Forestry & Urban Greening* 111 (September):128863.
<https://doi.org/10.1016/j.ufug.2025.128863>.
- Ahn, Mi Young, and Howard H. Davis. 2023. "Are Local Students Disadvantaged? Understanding Institutional, Local and National Sense of Belonging in Higher Education." *British Educational Research Journal* 49 (1): 19–34.
<https://doi.org/10.1002/berj.3826>.
- Bai, Yanping. 2017. "The Cultural Expression of Campus Landscape Design in Higher Vocational Colleges under the Background of School - Enterprise Cooperation." In *International Conference on Social Sciences, Arts and Humanities (SSAH 2017)*. UK: Francis Academic Press.
- Binti Md Masud Rana, Nurdiana, Nuramirah Binti Rayeesudeen, Nurdyana Aqylah Binti Abdul Jalil, and Nurshahira Binti Mohamed Zainul Abideen. 2023. "An Overview of Mental Health on Stress Among Students in USM." *Asian Pacific Journal of Management and Education* 6 (3): 106–16.
<https://doi.org/10.32535/apjme.v6i3.2673>.
- Chandler, Michael J., and Christopher Lalonde. 1998. "Cultural Continuity as a Hedge against Suicide in Canada's First Nations." *Transcultural Psychiatry* 35 (2): 191–219.
<https://doi.org/10.1177/136346159803500202>.
- Cheng, Deqiang, Chunliu Gao, Tiantian Shao, and Javed Iqbal. 2020. "A Landscape Study of Sichuan University (Wangjiang Campus) from the Perspective of Campus Tourism." *Land* 9 (12): 499.
<https://doi.org/10.3390/land9120499>.
- Cobb, Cory L., Seth J. Schwartz, and Charles R. Martinez. 2026. "A Theory of Cultural Continuity: Heritage Culture Retention as an Important Psychological Motivation." *Psychological Review* 133 (1): 94–112.
<https://doi.org/10.1037/rev0000561>.
- Deng, Li, and Chanam Lee. 2025. "How Perceived Campus Environments Influence College Students' Mental Health: Mediating Roles of Campus Life Experiences." *Journal of Environmental Psychology* 108 (December):102808.
<https://doi.org/10.1016/j.jenvp.2025.102808>.
- Dian Leila Sari. 2024. "The Influence of Campus Environment on the Development of Self-Identity of Adolescent Students." *International Journal of Educational Research* 1(3), 11–23.
<https://doi.org/10.62951/ijer.v1i3.42>
- Etopio, Aubrey L., Paul Devereux, and Marisa Crowder. 2019. "Perceived Campus Safety as a Mediator of the Link between Gender and Mental Health in a National U.S. College Sample." *Women & Health* 59 (7): 703–17.
<https://doi.org/10.1080/03630242.2018.1549646>.
- Ghani, Khairunnisa Mohd Abd, Azahar Harun, Sharmiza Abu Hassan, and Ohm Pattanachotti. 2023. "Understanding the Role of Campus Public Sculpture Installations." In *2023 IEEE 12th International Conference on Engineering Education (ICEED)*, 44–49. IEEE.
<https://doi.org/10.1109/ICEED59801.2023.10264029>.
- Gifford, Robert. 2014. "Environmental Psychology Matters." *Annual Review of Psychology* 65 (1): 541–79.
<https://doi.org/10.1146/annurev-psych-010213-115048>.
- Gong, Z., Zhang, Z., Zhou, J., Zhou, J., and Wang, W. 2022. "The Evolutionary Process and Mechanism of Cultural Landscapes: An Integrated Perspective of Landscape Ecology and Evolutionary Economic Geography."

- Land* 11(11)
<https://doi.org/10.3390/land11112062>
- Hussain, Mohd Amirul, Mohd Yazid Mohd Yunos, Nor Atiah Ismail, Nor Fazamimah Mohd Ariffin, and Sumarni Ismail. 2020. "A Review of the Elements of Nature and the Malay Cultural Landscape through Malay Literature." *Sustainability* 12 (6): 2154. <https://doi.org/10.3390/su12062154>.
- Kaur Mehar Singh, Manjet, and Wenou Xue. 2025. "Review of Intercultural Academic and Social Challenges among Chinese International Students in Malaysia." *Journal of International Students* 15 (11): 99–120. <https://doi.org/10.32674/f8zc6t90>.
- Kirmayer, Laurence, Cori Simpson, and Margaret Cargo. 2003. "Healing Traditions: Culture, Community and Mental Health Promotion with Canadian Aboriginal Peoples." *Australasian Psychiatry* 11 (1_suppl): S15–23. <https://doi.org/10.1046/j.1038-5282.2003.02010.x>.
- Lee, Molly, Chang Da Wan, and Morshidi Sirat. 2017. "Hybrid Universities in Malaysia." *Studies in Higher Education* 42 (10): 1870–86. <https://doi.org/10.1080/03075079.2017.1376871>.
- Li, Hongrui, Jiangtao Du, and David Chow. 2024. "Perceived Environmental Factors and Students' Mental Wellbeing in Outdoor Public Spaces of University Campuses: A Systematic Scoping Review." *Building and Environment* 265 (November): 112023. <https://doi.org/10.1016/j.buildenv.2024.112023>.
- Li, Meng, Gehan Selim, Pam Birtill, and Louise Banahene. 2025. "Designing Belonging: A Spatial Framework for Understanding University Campus Experiences." *Archnet-IJAR: International Journal of Architectural Research*, November, 1–23. <https://doi.org/10.1108/ARCH-05-2025-0199>.
- Ling, Zhang, Massoomeh Hedayati Marzbali, and Du Yang. 2024. "Perception of Safety and Outdoor Physical Activity Among Students In University Campuses: Does Place Attachment Matters?" *Planning Malaysia* 22 (November). <https://doi.org/10.21837/pm.v22i34.1612>.
- Marcouyeux, Aurore, and Ghazlane Fleury-Bahi. 2011. "Place-Identity in a School Setting: Effects of the Place Image." *Environment and Behavior* 43 (3): 344–62. <https://doi.org/10.1177/0013916509352964>.
- Meagher, Benjamin R. 2020. "Seeing Yourself in Your Room: The Relationship Between Undergraduate Flourishing and Identification With Student Housing." *The Journal of College and University Student Housing* 47 (1). <https://doi.org/10.71348/001c.143761>.
- Mels, Tom. 2019. "Landscape Interpretation." In *Geography*. Oxford University Press. <https://doi.org/10.1093/obo/9780199874002-0201>.
- MENG, Lingjun, Qin HE, Jing GUO, and Xurui YAN. 2025. "Human-Oriented Scene-Based City Building: Construction Pathway for Beijing's Garden Scene from the Perspective of the Theory of Scenes." *Landscape Architecture* 32 (9): 47–56. <https://doi.org/10.3724/j.fjyl.LA20250056>.
- Mousighichi, Pouya, Paniz Mousavi Samimi, and Baharak Mousapour. 2024. "Impact of Biophilic Design Parameters on University Students' Place Attachment and Quality of Campus Life." *The Journal of Architecture* 29 (1–2): 99–125. <https://doi.org/10.1080/13602365.2024.2331505>.
- Moussa, Nahla Mohamed. 2021. "International Students' Achievements and Adaptation to the United States' Culture." *Qualitative Research Journal* 21 (4): 498–512. <https://doi.org/10.1108/QRJ-11-2020-0145>.
- Panagiotopoulos, Diamantis, Fabienne Wallenwein, Georg Mildenberger, and Gudrun-Christine Schimpf. 2023. "A Dialogue between the Humanities and Social Sciences: Cultural Landscapes and Their Transformative Potential for Social Innovation." *Heritage* 6 (12): 7674–7705. <https://doi.org/10.3390/heritage6120404>.
- Pang, Xiaoxu, Mingqing Jia, and Yong Zhang. 2025. "Campus Landscape Perception Decoded by Surveys Combined with Eye Tracking: Visual and Cultural Perception for User Well-Being." *Building and Environment* 283 (September): 113341. <https://doi.org/10.1016/j.buildenv.2025.113341>.
- Phinney, Jean S., Gabriel Horenczyk, Karmela Liebkind, and Paul Vedder. 2001. "Ethnic Identity, Immigration, and Well-Being: An Interactional Perspective." *Journal of Social*

- Issues 57 (3): 493–510.
<https://doi.org/10.1111/0022-4537.00225>.
- Safizadeh, Mina, Massoomah Hedayati Marzbali, Mohammad Javad Maghsoodi Tilaki, and Aldrin Abdullah. 2023. "Assessing the Morphological Distribution of Urban Green Spaces for the Future Sustainable Greenery Planning: A Case Study of Penang, Malaysia." *Environment, Development and Sustainability* 26 (5): 11243–62.
<https://doi.org/10.1007/s10668-023-03260-7>.
- Salehi Kousalari, Farzaneh, Abdul Hamid Ghanbaran, Ali Sharghi, Ali Jahani, and Amir Satari Rad. 2025. "Predicting Visual Aesthetic Preferences in Tehran City Universities Campuses Using Machine Learning Techniques." *Scientific Reports* 15 (1): 36918.
<https://doi.org/10.1038/s41598-025-20922-w>.
- Sari, Erkin, and Mehmet Fatih Bükün. 2023. "Predictors of Life Quality in University Campuses: The Role of Campus Attachment and University Identification." *Nesne Psikoloji Dergisi* 11 (28).
<https://doi.org/10.7816/nesne-11-28-01>.
- Scannell, Leila, and Robert Gifford. 2010. "Defining Place Attachment: A Tripartite Organizing Framework." *Journal of Environmental Psychology* 30 (1): 1–10.
<https://doi.org/10.1016/j.jenvp.2009.09.006>.
- Shah Khaidzir, Mohd Fadhli, and Mafarhanatul Akmal Ahmad Kamal. 2023. "Sense of Place: Place Identity, Place Attachment and Place Dependence Among University Students." *International Journal of Academic Research in Business and Social Sciences* 13 (10).
<https://doi.org/10.6007/IJARBS/v13-i10/18945>.
- Stokols, Daniel. 1995. "The Paradox of Environmental Psychology." *American Psychologist* 50 (10): 821–37.
<https://doi.org/10.1037/0003-066X.50.10.821>.
- Su, Zhizhong, Jianing Li, and Jingzhong Li. 2015. "Exploration on Culture Landscape Design of University Campus 20." In *Proceedings of the 3rd International Conference on Advances in Energy and Environmental Science 2015*. Paris, France: Atlantis Press.
<https://doi.org/10.2991/icaees-15.2015.251>.
- Sun, Qingjiu, and Nor Zarifah Binti Maliki. 2015. "Sense of Place to Campus amongst Undergraduate Students in USM." In *Proceedings of the 2015 International Conference on Social Science, Education Management and Sports Education*. Paris, France: Atlantis Press.
<https://doi.org/10.2991/ssemse-15.2015.44>.
- Ting, Hiew Yoke, and Azizi Bahauddin. 2022. 'The Impact of Blue Space in the Interior on Mental Health'. *ARTEKS: Jurnal Teknik Arsitektur* 7 (1).
<https://doi.org/https://doi.org/10.30822/arteks.v7i1.1186>.
- Wang, Wenjun. 2019. "Research on the Elements of Campus Cultural Landscape Design." In *International Conference on Education and Social Science*.
- Worsley, J. D., Harrison, P., & Corcoran, R. 2021. "Bridging the Gap: Exploring the Unique Transition From Home, School or College Into University." *Frontiers in Public Health* 9
<https://doi.org/10.3389/fpubh.2021.634285>
- Xiong, Chenhui. 2021. "Campus Landscape Planning and Design Based on Regional Culture." *IOP Conference Series: Earth and Environmental Science* 760 (1): 012008.
<https://doi.org/10.1088/1755-1315/760/1/012008>.
- Xu, Mengjie, Marien de Bakker, Dirk Strijker, and Hongmei Wu. 2015. "Effects of Distance from Home to Campus on Undergraduate Place Attachment and University Experience in China." *Journal of Environmental Psychology* 43 (September):95–104.
<https://doi.org/10.1016/j.jenvp.2015.05.013>.
- Xu, Yan. 2024. "Chinese Cultural Landscapes: From the Ideal of a Balanced Bond between Humans and Nature to Ecological Forms of Life." *Trans/Form/Ação* 47 (4).
<https://doi.org/10.1590/0101-3173.2024.v47.n4.e0240067>.
- Yan, Li. 2015. "Study on Optimal Design of University Campus Landscape on the Basis of Educational Function." In *Proceedings of the 2015 International Conference on Arts, Design and Contemporary Education*. Paris, France: Atlantis Press.
<https://doi.org/10.2991/icadce-15.2015.110>.
- Zahnow, Renee. 2024. "Place Type or Place Function: What Matters for Place Attachment?" *American Journal of Community Psychology* 73 (3–4): 446–60.
<https://doi.org/10.1002/ajcp.12722>.
- Zamri, Zulfaqar, and Hakimi Ahmad. 2025. 'The Influences of Biophilic Design on Mental Health in Coworking Space'. *ARTEKS: Jurnal Teknik Arsitektur* 10 (1).

- <https://doi.org/https://doi.org/10.30822/arteks.v10i1.3574>.
- Zhang, Jingyuan, Sai Liu, Kun Liu, and Fang Bian. 2025. "How Does Campus-Scape Influence University Students' Restorative Experiences: Evidences from Simultaneously Collected Physiological and Psychological Data." *Urban Forestry & Urban Greening* 107 (May):128779. <https://doi.org/10.1016/j.ufug.2025.128779>.
- Zhang, Ruoshi, Weiyue Duan, and Zhikai Zheng. 2024. "Multimodal Quantitative Research on the Emotional Attachment Characteristics between People and the Built Environment Based on the Immersive VR Eye-Tracking Experiment." *Land* 13 (1): 52. <https://doi.org/10.3390/land13010052>.
- Zou, Tao, Fangyuan Zheng, Yuhui Wang, Chong Zuo, Lanting Zhou, and Wanzhen Zhou. 2025. "Campus Cultural Landscape Map: Design and User Experience Measurement." *Cartography and Geographic Information Science*, October, 1–19. <https://doi.org/10.1080/15230406.2025.2570283>.

Author(s) contribution

Ling Zhang contributed to the research concepts preparation, methodologies, investigations, data analysis, visualization, articles drafting and revisions.

Massoomeh Hedayati Marzbali contribute to the research concepts preparation and literature reviews, data analysis, of article drafts preparation and validation.

Yang Du contribute to methodology, supervision, and validation.

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