Designing for Disciplinary Diversity: A Comparative Analysis of Preferences in Informal Learning Environments

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Abstract

In the contemporary academic landscape, Informal Learning Environments (ILEs) serve as critical infrastructure for fostering productivity, cross-disciplinary inspiration, and social cohesion. This research investigates the inherent nexus between disciplinary nature and spatial requirements through a detailed comparative study of students within Creative and STEM (Science, Technology, Engineering, and Mathematics) clusters. The study addresses a central problem: how the distinct spatial behaviours and co-cognitive demands of different academic disciplines necessitate specialised interior design interventions within shared university territories. Employing an Exploratory Sequential Mixed-Methods design, the research initially utilised qualitative in-depth interviews to map the nuanced environmental preferences and habitus of both cohorts. These qualitative insights informed the subsequent development of a quantitative survey administered to a sample of 305 students. Data analysis validates significant distinctions: whilst Creative students demonstrate a clear proclivity for high-modularity environments and collaborative-intensive zones that facilitate visual stimuli, STEM students prioritise acoustic insulation, technological integration, and focus-intensive configurations optimised for sustained cognitive work. The findings reveal that students from different disciplines have distinct requirements and exhibit unique spatial characteristics rooted in their respective academic backgrounds. Consequently, the research argues against homogenous universalist design, advocating instead for flexibility, adjustable elements, and the implementation of various specialised zones. The study culminates in strategic recommendations for hybrid configurations that favour a balance between the fluid, collaborative needs of the creative process and the precision-oriented requirements of STEM disciplines.

Keywords: informal learning environments, third place, learning space design, disciplinary culture, mixed methods, higher education

Introduction

Higher education institutions have, particularly since the early 2000s, substantially expanded their allocation of resources to spaces that sit outside the traditional lecture theatre or seminar room. Co-working lounges, informal study commons, maker spaces, and campus cafés are now routinely positioned as essential infrastructure for student learning, socialisation, and wellbeing, rather than as incidental leftover space between classrooms. These settings are referred to collectively as informal learning environments (ILEs). While the broader distinction between formal and informal learning dates to the mid-twentieth century, the dedicated ILE first appeared on university campuses in the early-to-mid 1990s in the form of the library "information commons," which reorganised study space around shared access to emerging digital resources (Beagle, 1999). The Information Arcade at the University of Iowa (1992) and the Information Commons at the University of Southern California (1994) are among the earliest and most widely cited examples (Heitsch & Holley, 2011). Over the following two decades, this model evolved from the technology-centred information commons into the more socially oriented "learning commons" and, ultimately, into a broader re-conception of the entire campus as a learning space (Jamieson, 2009). This trajectory reflects a growing recognition within the learning-space literature that a significant proportion of meaningful student learning, collaboration, and identity formation occurs outside scheduled, instructor-led activity, in spaces that students choose for themselves, on their own terms.

Research Problem

Despite growing institutional investment in informal learning environments, design decisions are frequently driven by aesthetic trends or generic templates rather than empirical evidence of how students utilise space. This standardised planning conflicts with the foundational premise that different academic fields possess unique learning traits and behavioural needs. As established by Biglan (1973), disciplines occupy distinct knowledge domains. Consequently, students approach their work through separate cognitive styles grounded in Kolb's (1984) experiential learning theory (Biglan, 1973; Kolb, 1984).

These distinct profiles create disparate spatial requirements. For example, Fine Arts students require informal spaces designed to store and display in-progress physical artefacts safely. Conversely, Engineering students require environments optimised for testing and assembling electronic prototypes. Because a generic design ignores these distinct academic tasks, it risks satisfying neither group. This represents both a practical institutional inefficiency and a missed opportunity to leverage physical space as a strategic tool for supporting disciplinary identity and productivity.

Purpose and Research Questions

The purpose of this study is to empirically compare the informal learning environment preferences of students across creative clusters and STEM clusters in order to generate evidence-based recommendations for discipline-responsive space design. The study is guided by three research questions:

- RQ1: Do students from creative and STEM clusters differ in their demographic composition and patterns of common space use regarding day, time, and purpose?
- RQ2: Do students from creative and STEM clusters differ in their preferences for working style, seating, furniture, and supportive spaces?

RQ3: Do students from creative and STEM clusters differ in their preferences for relaxation behaviour and ambient environmental qualities such as lighting, colour, and atmosphere?

Theoretical Framework

Informal Learning Environments and Spatial Theory

Informal learning environments (ILEs) are spaces where collaboration, study, and academic socialisation occur outside scheduled, instructor-directed activities (Jamieson, 2003; Temple, 2008). Moving beyond simple definitions of what the formal classroom is not, contemporary socio-spatial theory defines ILEs by their learner agency. Harrison et al. (2009) conceptualise these settings as "learning landscapes," which are integrated physical and digital ecosystems supporting self-directed, student-led knowledge construction. Unlike a rigid lecture theatre, an informal space offers functional flexibility and variable spatial affordances, fluidly accommodating solo deep-focus work, peer tutoring, and casual interactions (Harrison et al., 2009).

Higher education literature historically treated physical space as a static backdrop, secondary to curriculum or pedagogy (Temple, 2008). Modern scholarship corrects this by drawing on spatial theorists like Henri Lefebvre (1974/1991), who argued that institutional spaces are not neutral containers but are socially produced structures that users actively reappropriate or subvert (Lefebvre, 1992). Applying this concept, Boys (2011) posits that the physical environment operates as a silent pedagogy, communicating implicit messages regarding power, belonging, and institutional validation. Consequently, designing an ILE is a critical pedagogical decision rather than a facilities-management task. As students navigate these fluid spatial boundaries, they actively negotiate their identities as scholars, directly influencing academic engagement and student retention (Boys, 2011; Matthews et al., 2011).

Disciplinary Cultures and Spatial Implications

Academic disciplines differ not only in what they teach but in how their members think, communicate, and work. Becher's (1989) hard/soft taxonomy captures this distinction: "hard" disciplines (including most engineering and computing fields) tend toward cumulative, quantitative, convergent knowledge-building, whereas "soft" and applied creative disciplines tend toward more iterative, qualitative, divergent, studio-based modes of knowledge-building. Building on this taxonomy, Becher and Trowler's (2001) influential account of "academic tribes and territories" argues that disciplines are not interchangeable containers of content but distinct cultures, each with characteristic epistemologies, communication norms, social structures, and, critically for this study, material and spatial practices. These differing epistemic cultures plausibly translate into differing spatial and material requirements, which the present study tests empirically (Becher, 1989; Becher & Trowler, 2001).

Reframing Informal Learning Environments as Contemporary Third Places

Informal learning environments can be productively reframed through the "third place," one of the most widely applied contemporary frameworks for understanding informal social space. First articulated in the late 1980s (Oldenburg, 1989, 1999) and since taken up across urban sociology, community planning, retail design, library science, and higher education, the third place describes a category of space distinct from the first place of home and the second place of work or school. Its core features are consistent: third places are neutral ground entered freely; they act as social levellers, open to all regardless of status; conversation and informal interaction are their primary activity; they keep a low, unpretentious profile; and, cumulatively, they function as a psychological “home away from home.”

Viewed through this lens, the informal learning environment is itself a third place within the university campus. Like the cafés the concept originally described, the campus common space sits outside the formal obligations of the classroom yet is not home, and students use it voluntarily for a fluid mix of study, collaboration, rest, and socialising. The qualities that make a third place work, being welcoming, accessible, and low in pressure, are precisely those that make an informal learning environment effective. Reframing the informal learning environment in this way positions it not as leftover study space but as a social setting whose design shapes students' sense of belonging on campus. In the present study, survey items on purpose of use operationalise this third-place function directly, while items on atmosphere and colour tone reflect the concept's emphasis on a playful, low-key, welcoming mood.

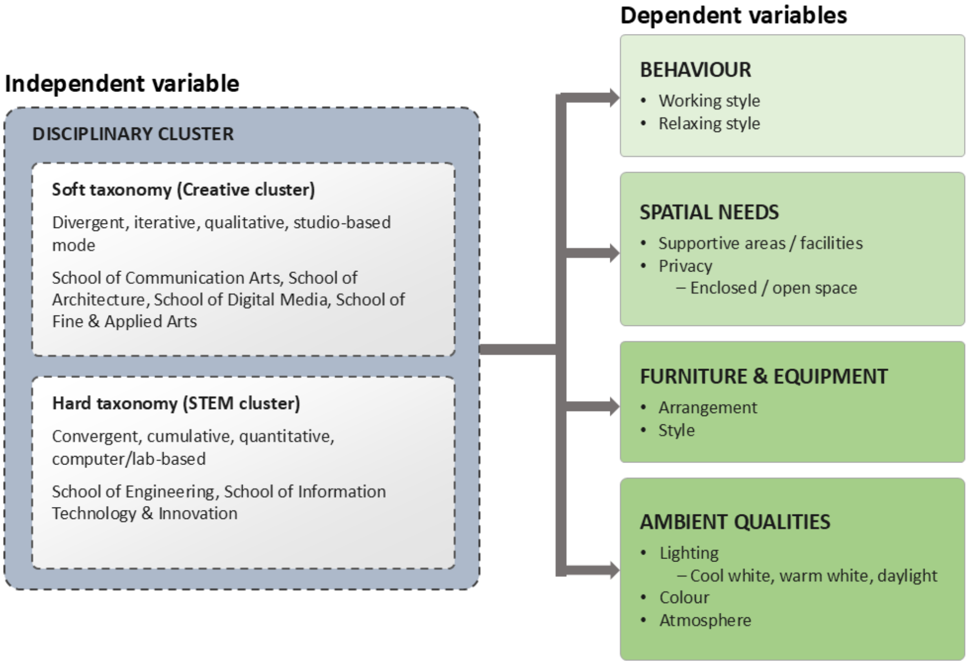
Environmental Design of Informal Learning Environments

Informal learning environments can also be understood through environmental psychology, which examines how physical settings shape behaviour, cognition, and wellbeing. A useful organising principle here is person-environment fit: the degree of congruence between an individual's needs and the affordances of their surroundings. From this perspective, a well-designed informal learning environment fits the empirically observed needs of its specific student population rather than a generic “average” user. Evidence from the wider learning-space literature confirms that this fit is consequential: Barrett et al. (2015) demonstrated empirically that physical design features have a significant impact on learning progress, identifying naturalness (including light, air quality, and temperature), individualisation (ownership and flexibility of the space), and stimulation (appropriate levels of colour and visual complexity) as the key contributing dimensions (Barrett et al., 2015).

Within this framework, several interior-design categories are especially relevant to informal learning environments. The first concerns privacy and territorial control. Altman's (1975) theory of privacy regulation conceptualises privacy as a dynamic process of opening and closing the self to others through control over physical boundaries; applied here, a preference for enclosed versus open seating can be understood as a privacy-regulation strategy that may vary with the demands of a student's discipline (Altman, 1975). A second category concerns the provision of distinct functional zones. Prior research consistently reports that students value both quiet, solo-oriented zones for focused work and more open, group-oriented zones for collaboration (Beckers et al., 2016; Harrop & Turpin, 2013), and that spatially well-defined zones support different modes of activity within a single setting. A third category concerns furniture. Flexible, movable, and varied furniture has been associated with greater interaction, collaboration, and engagement, and with students' ability to reconfigure a space to suit the task at hand (Cleveland & Fisher, 2014; Kariippanon et al., 2019). A fourth category concerns atmosphere and ambient conditions, particularly lighting and colour, which have been shown to influence mood, concentration, and comfort in learning settings (Barrett et al., 2015), making them integral rather than incidental to design. Taken together, these categories provide the design vocabulary through which the present study examines whether creative and STEM cluster students differ in the environments that best fit their needs.

Building on the theoretical concepts and empirical findings reviewed above, the key variables and factors were extracted and synthesised into a conceptual framework, with the resulting variable constructs illustrated in Figure 1.

Figure 1
Research Conceptual Framework and Variable Construct



Methodology

Research Design

This study employed a sequential exploratory mixed-methods design comprising a qualitative phase followed by a quantitative phase. In sequential exploratory designs, qualitative data collected in the first phase are used to inform the development of instruments or constructs tested in the second, quantitative phase—a strategy particularly well suited to research questions where the relevant variables are not yet well established in the local context and population.

Phase 1: Qualitative Strand—Instrument Development

Prior to questionnaire design, in-depth interviews were conducted with students from both the Creative and STEM clusters. The purpose of this qualitative phase was exploratory and instrumental rather than confirmatory: to surface the vocabulary, categories, and behavioural distinctions that students themselves use to describe their informal learning space needs, and to ensure that the subsequent quantitative questionnaire items were grounded in authentic student experience rather than researcher assumptions. The interview data were examined using qualitative analysis, specifically content analysis, to systematically extract the needs, behaviours, and preferences articulated by students within each cluster. The themes generated through this process directly informed the response options used in the multi-select items of the Phase 2 questionnaire (Questions 8, 10, 11, 12, and 19).

Phase 2: Quantitative Strand

Participants and Sampling. The quantitative sample comprised 305 students at a private university in Bangkok, recruited via convenience sampling across schools representing two disciplinary clusters. The Creative Cluster (n = 153, 50.2%) comprised Communication Arts (n = 69), Architecture (n = 34), Digital Media and Cinematic Arts (n = 29), and Fine and Applied Arts (n = 20). The STEM Cluster (n = 152, 49.8%) comprised Engineering (n = 96) and Information Technology and Innovation (n = 57). The sample was predominantly Bachelor's-degree students (97.4%), with small numbers of Master's (1.3%) and Doctoral (1.3%) students. Cluster assignment by school produced a near-perfect structural association ($\chi^2(5) = 301.04$, $p < .001$), confirming the cluster-coding scheme functions as a manipulation check rather than a substantive finding.

Instrument. The quantitative instrument was a structured, 26-item online questionnaire administered in English. Items 1–5 captured demographic and academic information. Items 6–8 captured patterns of common-space use (day, time, and purpose). Items 9–17 captured work-related preferences (working style, working-pattern behaviours, accessories, supportive space typologies, seating styles, and furniture style and arrangement). Items 18–22 captured relaxation-related preferences. Items 23–26 captured ambient environmental preferences (lighting, colour tone, and atmosphere). Five items (8, 10, 11, 12, and 19) were multi-select; all other items were single-select.

Data Analysis. For single-select items, Pearson chi-square (χ^2) tests of independence were conducted on the full contingency table. For multi-select items, each option was tested as a 2×2 table (selected vs. not, by cluster), df = 1. Cramér's V was calculated as effect size throughout ($V \approx .10$ small, .30 medium, .50 large). Where expected cell counts fell below 5 in over 20% of cells, categories were collapsed and re-tested. Given the volume of tests (k = 61), a Bonferroni-corrected threshold ($\alpha = .05/61 \approx .0008$) is reported alongside the conventional $\alpha = .05$ threshold. Analyses were conducted in Python (pandas, SciPy).

Results

Results are organised by research question: sample composition and usage patterns, work-related preferences, relaxation-related preferences, and ambient environmental preferences. A consolidated summary of all statistically significant and non-significant comparisons is provided in Tables 1 and 2.

Sample Composition (RQ1)

The two clusters were of comparable size (Creative n = 153, 50.2%; STEM n = 152, 49.8%) but differed significantly in gender composition ($\chi^2(2) = 17.54$, $p < .001$, $V = 0.24$): the Creative Cluster skewed female (62.1%), while the STEM Cluster skewed male. The clusters also differed significantly in year of study ($\chi^2(4) = 14.03$, $p = .007$, $V = 0.22$), with first-year students disproportionately Creative (73.1% of all Year 1 respondents). Programme level did not differ significantly ($\chi^2(1) = 0.12$, $p = .727$, $V = 0.02$).

Patterns of Common-Space Use (RQ1)

Both clusters showed an almost identical pattern of weekday-dominant use: 88.2% of both groups reported using the common space Monday–Friday ($\chi^2(1) = 0.00$, $p = 1.000$, $V = 0.00$).

Preferred time of use also did not differ significantly ($\chi^2(5) = 7.46$, $p = .189$, $V = 0.16$), with both clusters peaking in the early-to-mid afternoon. Stated purpose of use showed no significant cluster differences across any of the five options tested (all $p > .29$). Both clusters most frequently endorsed "to work" (Creative 63.4%, STEM 59.9%) and "to relax" (Creative 58.8%, STEM 63.8%), consistent with the dual work/leisure function central to Oldenburg's (1989) third-place concept.

Work-Related Preferences (RQ2)

In contrast to the usage-pattern findings, work-related preferences showed extensive and substantial divergence between clusters.

Working Style and Group Size

Preferred working style differed significantly between clusters ($\chi^2(2) = 12.56$, $p = .002$, $V = 0.20$). STEM students more strongly favoured small-group work (2–4 people: 58.6% versus Creative's 41.2%), while Creative students more strongly favoured large-group work (more than 4 people: 31.4% versus STEM's 15.8%). Preference for solitary, concentration-focused work was similar across clusters (Creative 27.5%, STEM 25.7%).

Working-Pattern Behaviours

Of ten working-pattern behaviours tested, six showed significant cluster differences. STEM students more often reported using shared computers (27.0% vs. 8.5%; $\chi^2(1) = 16.62$, $p < .001$, $V = 0.23$). Creative students more often reported editing video/audio (25.5% vs. 9.9%; $p = .001$, $V = 0.20$), practising speaking/performing (18.3% vs. 6.6%; $p = .003$, $V = 0.17$), drawing/making art (28.1% vs. 13.8%; $p = .003$, $V = 0.17$), shooting content/live-streaming (13.7% vs. 4.6%; $p = .010$, $V = 0.15$), and model-cutting/electronics (19.0% vs. 9.2%; $p = .023$, $V = 0.13$). Behaviours common to both—writing/notes, laptop/iPad use, studying/meetings, brainstorming—showed no differences (all $p > .32$).

Accessories and Equipment

Of eight accessory types tested, three showed significant differences. Creative students were significantly more likely to use cutting mats (19.0% versus 2.6%; $\chi^2(1) = 19.40$, $p < .001$, $V = 0.25$) and content-shooting equipment (24.2% versus 7.2%; $\chi^2(1) = 15.26$, $p < .001$, $V = 0.22$). STEM students were significantly more likely to use power strips (77.6% versus 64.7%; $\chi^2(1) = 5.59$, $p = .018$, $V = 0.14$).

Spaces That Support Work

The strongest disciplinary divergence in the dataset emerged for supportive space typologies: of eight space types, seven showed significant differences. STEM students showed stronger preference for an invention/maker testing area (40.1% vs. 12.4%; $\chi^2(1) = 28.85$, $p < .001$, $V = 0.31$), a brainstorming area (64.5% vs. 45.1%; $p = .001$, $V = 0.19$), and a quick-work area (40.8% vs. 28.1%; $p = .027$, $V = 0.13$). Creative students showed stronger preference for a dedicated relaxation area (13.1% vs. 0.0%; $\chi^2(1) = 19.18$, $p < .001$, $V = 0.25$), an art studio room (38.6% vs. 15.8%; $\chi^2(1) = 18.83$, $p < .001$, $V = 0.25$), a content studio room (35.9% vs. 17.1%; $\chi^2(1) = 12.93$, $p < .001$, $V = 0.21$), and a dressing room (15.0% vs. 4.6%; $\chi^2(1) = 8.21$, $p = .004$, $V = 0.16$). A general activity area showed no difference ($p = .651$).

Seating and Furniture

Seating style for working alone differed significantly ($\chi^2(3) = 8.06$, $p = .045$, $V = 0.16$): Creative students showed stronger preference for enclosed seating (35.9% vs. 27.6%) and standing workspaces (5.9% vs. 1.3%), while STEM students favoured semi-open seating (48.7% vs. 40.5%). Furniture set style also differed significantly ($\chi^2(1) = 5.05$, $p = .025$, $V = 0.13$): both clusters preferred casual over office style, more strongly among Creative students (79.7% vs. 67.8%). Seating for small-group ($p = .661$) and large-group work ($p = .888$), and furniture arrangement (collapsed; $p = .108$), showed no significant differences.

Relaxation-Related Preferences (RQ3)

Relaxation-related preferences showed almost uniform convergence between clusters. Overall relaxing-style preference did not differ significantly ($\chi^2(2) = 0.85$, $p = .655$, $V = 0.05$), nor did any of the nine relaxation-pattern behaviours (all $p > .09$). Seating style for group relaxation ($p = .311$) and relaxation furniture style ($p = .688$) likewise showed no significant differences. The one significant exception was seating style for relaxing alone ($\chi^2(2) = 8.12$, $p = .017$, $V = 0.16$): Creative students showed stronger preference for fully enclosed seating (62.7% versus 50.0%), while STEM students showed stronger preference for semi-open seating (32.2% versus 18.3%).

Ambient Environmental Preferences (RQ3)

None of the four ambient-environment items—lighting for the work area ($p = .486$), lighting for the relaxation area ($p = .249$), colour tone ($p = .978$), and overall preferred atmosphere ($p = .331$)—showed statistically significant cluster differences. Both clusters overwhelmingly preferred neutral colour tones (Creative 68.0%, STEM 67.8%) and showed broadly similar distributions across lighting types and atmosphere styles, with “warm and close to nature” and “simple style” most frequently endorsed in both groups.

Summary of Findings

Table 1 summarises all statistically significant cluster differences ($p < .05$); Table 2 summarises all non-significant comparisons. Of 61 total comparisons, 23 (37.7%) reached conventional significance. Applying the Bonferroni-corrected threshold ($\alpha \approx .0008$) retains nine findings as robust: Gender, School (structural), Working style, Using shared computers, Editing video/audio, Cutting mat, Content-shooting equipment, Invention/maker testing area, and Relaxation area.

Table 1

Statistically Significant Differences Between Clusters (p < .05)

Item	Variable / Option	χ^2	df	p	V	Direction
Q1	Gender	17.54	2	<.001	0.24	Creative ↑ female; STEM ↑ male
Q3	Year of study	14.03	4	.007	0.22	Year 1 ↑ Creative
Q5	School[1]	301.04	5	<.001	0.99	Structural
Q9	Working style	12.56	2	.002	0.20	STEM ↑ small groups; Creative ↑ large groups
Q10	Using shared computers	16.62	1	<.001	0.23	STEM higher
Q10	Editing video/audio	11.72	1	.001	0.20	Creative higher
Q10	Practising speaking/performing	8.56	1	.003	0.17	Creative higher
Q10	Drawing/making art	8.55	1	.003	0.17	Creative higher
Q10	Shooting content/streaming	6.55	1	.010	0.15	Creative higher
Q10	Model cutting/electronics	5.20	1	.023	0.13	Creative higher
Q11	Cutting mat	19.40	1	<.001	0.25	Creative higher
Q11	Content-shooting equipment	15.26	1	<.001	0.22	Creative higher
Q11	Power strip	5.59	1	.018	0.14	STEM higher
Q12	Invention/maker testing area	28.85	1	<.001	0.31	STEM higher
Q12	Relaxation area	19.18	1	<.001	0.25	Creative higher (STEM = 0%)
Q12	Art studio room	18.83	1	<.001	0.25	Creative higher
Q12	Content studio room	12.93	1	<.001	0.21	Creative higher
Q12	Brainstorming area	10.79	1	.001	0.19	STEM higher
Q12	Dressing room	8.21	1	.004	0.16	Creative higher
Q12	Quick-work area	4.89	1	.027	0.13	STEM higher
Q13	Seating — working alone	8.06	3	.045	0.16	Creative ↑ standing/enclosed
Q16	Furniture style for work	5.05	1	.025	0.13	Creative ↑ casual style
Q20	Seating — relaxing alone	8.12	2	.017	0.16	Creative ↑ enclosed; STEM ↑ semi-open

Note. [1] Q5 (School) is a manipulation check; Cluster was operationally defined by School.

Table 2

Non-Significant Differences Between Clusters (p ≥ .05)

Item	Variable / Option	χ^2	df	p	V
Q2	Programme (degree level)[2]	0.12	1	.727	0.02
Q6	Day of common-space use	0.00	1	1.000	0.00
Q7	Time of common-space use	7.46	5	.189	0.16
Q8	To work	0.27	1	.606	0.03
Q8	To relax	0.60	1	.437	0.04
Q8	To meet/chat	0.27	1	.604	0.03
Q8	Waiting (class/parents)	1.09	1	.296	0.06

Q8	Practise learning skills	0.04	1	.845	0.01
Q10	Writing/taking notes	0.96	1	.327	0.06
Q10	Laptop/iPad use	0.96	1	.327	0.06
Q10	Studying/online meetings	0.66	1	.417	0.05
Q10	Brainstorming	0.03	1	.871	0.01
Q11	Connectors/cables	1.99	1	.159	0.08
Q11	Writing/flip board	0.81	1	.369	0.05
Q11	Printer/photocopier	0.32	1	.569	0.03
Q11	TV/Projector	0.03	1	.862	0.01
Q11	Headset with microphone	0.03	1	.869	0.01
Q12	Activity area	0.20	1	.651	0.03
Q14	Seating — small-group work	0.83	2	.661	0.05
Q15	Seating — large-group work	0.24	2	.888	0.03
Q17	Furniture arrangement style[3]	2.58	1	.108	0.09
Q18	Relaxing style preference	0.85	2	.655	0.05
Q19	Taking selfies	2.85	1	.091	0.10
Q19	Watching movies/music/karaoke	2.77	1	.096	0.10
Q19	Playing games	2.76	1	.097	0.10
Q19	Snacks/drinks	1.02	1	.312	0.06
Q19	Chatting with friends	0.40	1	.527	0.04
Q19	Reading books	0.20	1	.655	0.03
Q19	Relaxing in quiet atmosphere	0.16	1	.689	0.02
Q19	Playing music	0.14	1	.710	0.02
Q19	Napping	0.03	1	.858	0.01
Q21	Seating — relaxing in group	2.33	2	.311	0.09
Q22	Furniture style for relaxation	1.47	3	.688	0.07
Q23	Lighting — work area	1.44	2	.486	0.07
Q24	Lighting — relaxation area	2.78	2	.249	0.10
Q25	Colour tone preference	0.04	2	.978	0.01
Q26	Preferred atmosphere	5.76	5	.331	0.14

Note. [2] Collapsed categories (Bachelor's vs. Postgraduate). [3] Collapsed categories (duplicate labels merged); uncollapsed test produced a spurious result.

Discussion

A Shared Space With Divergent Functional Needs

The results support the conceptual framework. This discussion treats the campus common space as an informal learning environment (ILE) understood through Oldenburg's (1989) "third place," two terms for the same setting viewed from complementary angles: "ILE" names its educational function, while "third place" names its social role as a space distinct from home and formal obligation. At the level of this broad third-place function, the two clusters are strikingly similar. Both use the ILE predominantly on weekday afternoons, endorse "to work" and "to relax" in near-identical proportions, relax in similar ways, and favour the same neutral palette and warm-natural atmosphere. This convergence is consistent with Oldenburg's (1989) account of a universal need for a neutral, low-pressure, sociable space, one that does not appear to vary by discipline (Oldenburg, 1989).

The clusters diverge sharply, however, in the material and spatial infrastructure required for their discipline-specific work. This divergence is concentrated in the work domain rather than the relaxation domain, and is most pronounced in the "spaces that support your work" construct, where seven of eight options showed significant differences. This selective pattern, convergence in affective and social function alongside divergence in instrumental and material function, refines third-place theory in the higher-education context: the ILE may be simultaneously a unified third place at the social-affective level and a contested, discipline-differentiated territory at the material-functional level.

Disciplinary Culture in Material Practice

The specific content of the disciplinary divergence aligns closely with Becher and Trowler's (2001) academic tribes framework. STEM-cluster students' elevated preference for invention/maker testing areas, brainstorming areas, shared computers, and quick-work areas reflects the structured, cumulative, collectively verified problem-solving characteristic of "hard" disciplines. Creative-cluster students' elevated preference for art studio rooms, content studio rooms, dressing rooms, and dedicated relaxation areas reflects the embodied, material, and performative knowledge-building characteristic of "soft," applied creative disciplines—work that requires specialised, often equipment-intensive space that a generic open-plan common area cannot adequately support (Becher & Trowler, 2001).

The enclosure-preference findings add an environmental-psychology dimension to this picture. Creative-cluster students' consistently stronger preference for fully enclosed seating—evident both in solo work and solo relaxation—may reflect the privacy-regulation demands (Altman, 1975) of creative practice, which often involves vulnerable, in-progress work that benefits from visual and acoustic boundary control. STEM-cluster students' stronger preference for semi-open seating may instead reflect a working culture oriented toward visibility, peer consultation, and lower-stakes information sharing (Altman, 1975).

Design Implications

These findings carry direct implications for the planning and design of informal learning environments. First, the strong convergence in ambient and affective preferences suggests that universities can reasonably standardise the base "atmosphere layer" of an ILE (neutral colour tones, natural or daylight-style lighting, and an unpretentious, nature-adjacent or simple aesthetic) across buildings serving different disciplines without risk of alienating either population. Because this layer supports the ILE's shared third-place role rather than any discipline-specific practice, a common baseline is appropriate.

Second, the pronounced divergence in supportive-space typology indicates that the ILE's learning function is not discipline-neutral: a single, undifferentiated open-plan space is unlikely to support the distinct ways Creative and STEM students actually work and learn. Where an ILE primarily serves Creative-discipline students, planners should prioritise zoned, semienclosed or fully enclosed sub-spaces such as a small studio, a content-capture corner, and a quiet relaxation nook. Where it primarily serves STEM-discipline students, planners should prioritise shared technical infrastructure and open brainstorming zones.

Third, for shared or disciplinarily mixed ILEs, these findings argue for a deliberately zoned, hybrid design: a flexible core area satisfying the shared third-place function, surrounded by smaller, differentiated pockets addressing discipline-specific learning needs. Furniture procurement should be diversified accordingly, offering both casual and office-style seating and both enclosed and semi-open configurations in individual-work zones.

Limitations

Several limitations qualify these findings. First, the study was conducted at a single private university in Thailand, so the specific clusters and patterns reported here may not generalise to institutions with different programme structures or cultural contexts. Second, the sample relied on convenience sampling, and the significant cluster imbalance in the Gender variable may confound findings attributed to discipline; future analyses could incorporate gender as a covariate. Third, because many statistical comparisons were conducted, some individually significant results may reflect chance; the findings emphasised here are those that remained robust across the analysis, while weaker results should be read as suggestive. Fourth, the qualitative phase would benefit from a larger and more varied pool of respondents, allowing a fuller exploration of the range of student lifestyles that shape how these spaces are used. Finally, the cross-sectional design cannot establish whether preferences shift as students progress through their programme.

Conclusion

This study tested whether Creative and STEM students differ in their preferences for informal learning environments, using a sequential exploratory mixed-methods design in which qualitative interviews informed a 305-respondent survey. The results yield a qualified answer: divergence and convergence coexist, depending on the dimension examined. Demographic composition, working style, working-pattern behaviour, equipment use, supportive-space typology, and solo-seating enclosure each showed significant divergence, most pronounced in the spaces that support work. Ambient and experiential dimensions, by contrast, showed striking convergence: usage timing, broad purpose, relaxation behaviour, and lighting, colour, and atmosphere.

Taken together, these findings suggest the campus informal learning environment is dual in nature. In its social and affective role, it functions as a unified space whose needs converge across disciplines: students of all backgrounds seek the same relaxed, low-pressure setting to work and unwind. In its learning role, it functions as a differentiated space whose needs diverge, because the material and spatial practices through which Creative and STEM students learn are markedly different. A more effective design approach therefore combines a shared, ambience-consistent core serving these universal needs with zoned, discipline-responsive sub-spaces accommodating the specific learning practices of the communities the space serves. Attending to this dual nature, unity in social function and diversity in learning function, offers an evidence-based path toward space that genuinely fits a disciplinarily diverse student body.

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Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The author declares that AI-assisted writing software was used in proofreading and refining the language used in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The author further declares that, apart from Claude, no other AI or AI-assisted technologies have been used to generate content in writing the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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