SENSE OF COMMUNITY: OPEN SHARED SPACES IN A MALAYSIAN PRIVATE CAMPUS

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Abstract

An increasing focus on learning space design emphasises positive well-being and a stronger sense of connectedness among students. While formal learning spaces like lecture theatres, labs, and classrooms remain crucial, recent research highlights the significance of informal and shared learning spaces within educational institutions, as they support students' learning and social interactions. This study takes a private urban university campus in Malaysia as a case study to examine how the design qualities of open shared spaces in a learning environment can facilitate learning and cultivate a sense of community. In this context, behaviour settings observation was adopted to assess the spatial quality of informal learning spaces, leading to findings that underscore the importance of the interplay between the individual (student), the environment, and their behaviour. The environment should be initially designed with its intended purpose in mind, striking a balance between structured and unstructured activities, fostering creativity, and promoting a sense of belonging to nurture a strong sense of community.

Keywords: Behaviourology, Design quality, Informal learning, Open shared spaces, Sense of community.

1. Introduction

The design of the learning environment significantly influences students' learning abilities. With the improved accessibility of higher education in Malaysia, which reached 44% in 2016 and has become the preferred choice for students, higher education institutions face challenges in addressing students' learning, social, and spiritual needs [1]. As the number of higher learning institutions increases and Malaysia endeavours to position itself as the best choice for higher education, these institutions must prioritise addressing students' learning and social needs. Unfortunately, the sense of community within higher education has been increasingly obscured, leading to negative consequences where some students feel a lack of belongingness to their institution.

Most campuses were traditionally designed as indoor environments, often surrounded by parking lots and other paved spaces that are not conducive to learning. Due to the lack of engagement from the surrounding community, some students have expressed a feeling of detachment from their institution. However, establishing positive relationships forms the cornerstone of a learning community where students can truly enjoy their educational experience. This aspect is vital for fostering both personal and social development.

The design potential of all educational spaces extends beyond the formalised learning environments, such as classrooms and lecture halls. The in-between spaces that connect these formal areas can be optimised for informal learning, fostering stronger connections among students and the broader learning community. Existing research has demonstrated that learning environments with a strong sense of community offer numerous academic benefits, including increased social connectedness, facilitation of community formation, and enhanced identity [2].

Although the current research provides a rich theoretical foundation, it often remains broad and speculative, lacking in-depth studies on evaluating design aspects that effectively facilitate social interactions. Therefore, further research is needed to delve into the practical evaluation of these design elements and their impact on fostering meaningful social interactions within educational spaces.

Taking this as a point of departure, this study examined the design qualities of informal shared learning environments that can foster a sense of community, using a Malaysian private tertiary campus as a case. Informal shared spaces offer opportunities for architectural intervention and the use of shared spaces outside the classroom. The study modestly seeks to bridge the gap caused by the paradigm shift in learning, redefining today's education and the concept of community. Introducing learning spaces with community-building initiatives aims to create a vibrant campus community, enriching the overall educational experience.

2. Literature Review

The reviewed literature is structured around several key notions, including the concept of a sense of community, the attributes of informal shared spaces as social learning environments, the design qualities of informal shared spaces, and the behaviour setting theory.

2.1. Sense of community

The seminal work of Dewey [3] introduced the concept of a campus as a 'social place.' This highlights the importance of campuses as spaces for academic learning and environments where students develop social skills and cues. Tinto's theories [4] on social integration and the notion of a sense of belonging propose that positive interactions in both educational and social contexts contribute to successful integration into the school community, ultimately leading to students' sense of community within educational institutions. When students experience a sense of community with their peers can foster enhanced learning, satisfaction, and retention rates [5].

While there has been diverse scholarship on the sense of community and education settings, there has been a standard reference suggestive towards the person-environment-behaviour relationship. According to Lickona and Davidson [6], there are three aspects in the creation of a sense of community: (1) perceptions of student respect - students' perception of respect towards their friends, teachers, and school in general and school personnel; (2) perceptions of student friendship and belonging - students' feelings towards friendship and being part of the school; (3) Perception of students' shaping of their environment - behaviours related to the happenings surrounding the school environment.

2.2. Informal shared spaces as a social learning environment

The pedagogical shift from traditional classrooms towards independent learning, social collaboration, and group work has highlighted the importance of social learning environments in educational settings [7]. Social spaces are integral to the learning environment, facilitating learning through interactions rather than solely relying on knowledge acquisition. Williamson and Nodder [8], citing Ray Oldenburg's description, define social learning spaces as "physical and/or virtual areas that are not predominantly identified with either social or study perspectives but transcend both, facilitating formal and informal student-centred collaborative learning."

Johnson and Lomas [9] further emphasise that social learning thrives on social interaction, making it essential for spaces to support dialogue, peer learning, and various other forms of interactions among students.

Informal shared spaces should be carefully designed and developed to accommodate activities with varying noise levels, such as group interactions that may be noisy, as well as silent study. Additionally, flexibility is essential, allowing these spaces to host diverse activities throughout the day. The frequency of spatial use depends on the location and design of these areas [10].

Moreover, space usage must be versatile, offering seating and eating areas and providing Wi-Fi connectivity [11]. The spatial characteristics of these informal spaces should embody comfort, flexibility, a welcoming atmosphere, interactivity, and aesthetic appeal [12]. According to the Joint Information Systems Committee [13], several design requirements should be considered, such as the capacity to facilitate learning and motivate students, support both group and individual learning environments, promote inclusivity, and offer flexibility and adaptability in terms of use and settings.

2.3. Design qualities of informal shared learning spaces

Different types of spaces within the campus offer opportunities as informal open shared learning spaces. These spaces can be found within, between, adjacent to and connected with the external environment. The design qualities of these spaces are of utmost importance in fostering a conducive social learning environment.

The literature review highlights that the spatial organisation of built forms plays a crucial role in influencing circulation, connectivity, functionality, and social encounters, all of which contribute to fostering a sense of community within the campus. Shamsuddin et al. [14] propose that the design of buildings and outdoor spaces should be integrated, considering aspects such as composition, consistency, aesthetics, proportion, and scale and creating a sense of entrance that aligns positively with the campus's function as an academic community.

These integrated spaces offer numerous advantages as they optimise the use of time for students, who are motivated to stay and work during long gaps in their timetable. Furthermore, these spaces can create a sense of belonging and foster a cohesive community within the institution. To enhance learners' agency, the design principles of outdoor, informal, and social learning spaces include the provision of shelter, comfortable seating, power outlets, small 'eddy' spaces, Wi-Fi access, and reconfigurable group and individual seating. The availability of multiple power outlets, sofas, and access to café or kitchen facilities further enhances the functionality and appeal of these spaces [12].

The environmental qualities of informal shared spaces are crucial for ensuring human comfort, informed by factors such as lighting conditions, ventilation, thermal comfort, acoustic quality, seating arrangement, visual stimulation, and greenery. The function of open shared spaces depends on a thoughtful understanding of physical comfort, individual habits, needs, and social relationships [15].

Recent studies have shown that greenery in informal shared spaces contributes positively to the student experience [16] and reduces students' stress levels [17, 18]. These findings underscore the significance of incorporating natural elements into the design of informal shared spaces to create a conducive and comfortable environment that enhances students' well-being and academic experience.

2.4. Behaviour setting theory

Behaviourology involves studying the functional relationships between behaviour and the environment. The foundational work by Roger Barker defined a behaviour setting as occurring at the boundary between a standing pattern of behaviour and the milieu (environment), where behaviour takes place in the 'milieu' that, in some sense, aligns with the behaviour. The behaviour-setting survey measured eleven key descriptive attributes: Occurrence, Duration, Population, Occupancy Time, Penetration, Action Patterns, Behaviour Mechanisms, Richness, Pressure, Welfare, and Local Autonomy [19].

Behaviour setting in Action Patterns (AP) consists of the useful attributes of behaviour patterns, such as in education. The regularity of the activity (participation subscale) and its material production are observable for every action variable and can be applicable in another setting (supply subscale). Meanwhile, Behaviour

Mechanisms (BM) refer to the modal quality through which behaviour is implemented in the setting, such as gross motor movement, speaking, or thinking.

2.4.1. Human scale

The human scale focuses on the relationship between individuals in relation to space, ranging from intimate to social scales. Newman's [20] defensible space theory explores the concept of neighbourhood safety. In this study, he examines various distances between people. Firstly, personal space is approximately one to four feet between individuals. Secondly, intimate space is less than one foot and may involve physical contact with another person. Thirdly, social space is between 1.5 - 3m away between individuals, typically when conversing with another.

2.4.2. Activities

The physical setting of a space plays a pivotal role in influencing various activities conducted within it. As expounded by Gehl [21], three distinct types of activities, namely necessary, optional, and social, are observed as "resultant" outcomes of the setting. Necessary activities entail engagements wherein individuals have limited or no choice but to participate. Conversely, optional activities are subject to external factors such as time, weather conditions, and specific locations. Finally, social activities are contingent upon the presence and involvement of others in shared communal spaces. Considering these types of activities in the design of a campus is essential, as it allows for creating a variety of learning environments that promote social interaction.

Furthermore, Barker [19] acknowledged that different observers may perceive things differently based on their location and time of observation. This acknowledgement is grounded in the corollary assumption that an empirically derived theory, rooted in reality, is more valuable than a purely abstract one. Therefore, gathering more field information is valuable, as sound theoretical concepts often emerge through inductive reasoning.

3. Method

Taylor's University Lakeside Campus (TULC) was selected as the case study due to its reputation as a top and innovative private Malaysian Higher Education Institute (HEI), known for transformational teaching and learning, and its award-winning campus [22].

Among the numerous shared spaces on campus, nine were chosen for this study, categorised into three types: spaces between buildings, spaces within buildings, and spaces adjacent/connected to the outdoors. The fieldwork involved data collection through direct observation and behaviour mapping. Direct user observation enabled the researcher to conduct behaviour mapping and analyse human behaviour exhibited in informal shared spaces within an unstructured environment, focusing on examining the design qualities. The behaviour mapping exercise aimed to understand how users interact with the open shared spaces, explore the design potential of the site, identify site constraints, and assess how the design of the shared spaces impacts the campus community.

Observations were made through notetaking and mapping, focusing on aspects such as spatial and environmental qualities, types of activities, frequency of use,

and behaviour settings. Each behaviour map recorded the observation date and time, the layout of furniture and fittings, locations of openings such as windows, and physical objects/forms such as columns and seats, along with notes related to noise level, activities, and students' behaviours.

The obtained data were sketched and coded based on the literature review on behaviour settings. The findings were organised and categorised through this approach to study the person-environment-behaviour relationship, explicitly focusing on students' behaviour and physical activity. Behaviour maps were sketched, and notes were taken during the observation sessions, which took place during peak hours, either during the afternoon lunch hour period (12:30 - 2:00 pm) or after school - the total observation time at breakout spaces ranged from 30 minutes to 1 hour 30 minutes, with a minimum of 30 minutes spent on each behaviour map.

4. Design Qualities of the Informal Shared Spaces

The attributes of design quality in the informal shared spaces were analysed, and the findings revealed a tripartite relationship between person-environment-behaviour, where each aspect plays a distinct role in influencing the others.

The analysis of the nine informal spaces was categorised into three types: (1) spaces between buildings, which included the Breakout space/roof garden opposite Tiffin food kiosk @ L2, Taylor's University Square, and Taylor's Waterfront; (2) spaces within buildings, encompassing the Lower Concourse (Outside LT2 and next to the amphitheatre), C8 Breakout Space (Outside Computer lab), E8 Breakout Space (Outside classroom), and Cafeteria at Lower Concourse; and (3) spaces connected to the outside, which included Crescent Walkway outside Block A Main Hall and Outside Student Life Centre, Block A. The summarised results of these analyses are presented in Tables 1-3.

4.1. Legibility

The results showed that large areas with high legibility, accessibility, well-maintained footpaths, seats, facilities, safety, and visibility were essential design qualities that could increase the utilisation of open shared spaces. Social engagement with other students led to the discovery of new knowledge. Technologies were embedded in infrastructure and the equipment it interacted with, enhancing the learning experience within these spaces. As students became familiar with the place, their behaviour depended on the mental image of the layout of the physical environment, allowing for more efficient and personalised utilisation of the space.

Legibility was a key feature that is flexible and can accommodate future building reconfigurations. Learning space design considers students' behaviours, such as crowding, territoriality, and personal space. The effectiveness of shared space lies in its use, where the proximity of location is one of the key determinants of its popularity, as argued earlier by Marcus and Francis [10].

Legibility emerged as the most significant pattern concerning humane aspects, encompassing campus traditions, students' social needs, and their behaviour, thus contributing to the attributes of students' sense of community within Higher Education Institutions (HEIs). This finding aligned with Graetz's [23] four cognitive factors of environmental preference.

Table 1. Tabulation of Spaces in TULC by attributes of design quality.

			Spaces		
Location			Taylor's University Square @Lakeside	Taylor's Waterfront	Breakout space (roof garden) opposite Tiffin@ between Block C2&D2
Types of spaces			Space between building	Space between building	Space between building
Design Qualities	**Spatial Quality**	**Element**	Landmark	Edge	Node
		Human Scale	Monumental Scale (3.7-6.7m)	Intimate Scale (0.5-1.2m)	Intimate Scale (0.5-1.2m)
		Form	Fully open form	Fully open form	Fully open, partially enclosed, subtracted form
		Proportion	Large	Large	Medium
		Hierarchy	By size	By shape	By void
		Spatial connection	Node	Node	Node
		Outlook	Open, inviting	Calm and relaxed	Semi-private
		Circulation	Multiple-way circulation	Two-way circulation	Two-way circulation
		Material	Rough floor with artificial turfing	Rough floor texture	-Rough floor texture - Exposed structure
	Environmental Quality	**Greenery**	Able to see wholly	Able to see wholly	Able to see wholly
		Natural lighting	A mix of natural daylighting and artificial lighting	A mix of natural daylighting and artificial lighting	Only natural daylighting
		Natural Ventilation	Windy	Windy	Windy
		Weather	Bright (fully exposed to the sun or rain)	Bright (fully exposed to the sun or rain)	Bright (fully exposed to the sun or rain)
		Acoustic	Birds chirping	Birds chirping	Birds chirping, machinery noise
Behaviour Setting		**Behavioural Pattern**	Standing, walking, playing Frisbee (active)	Standing, walking, playing Frisbee (active)	Sitting, eating, talking, studying, and chilling around a square table (passive)
		Types of activity	Necessary, Optional (occasionally)	Necessary, Optional (occasionally)	Optional
		Occupancy frequency	30 minutes (Occurs only in the evening)	30 minutes (Occurs only in the evening)	30 minutes to 1 hour

Table 2. Tabulation of Spaces in TULC by attributes of design quality.

			Spaces		
	Location		Crescent Walkway @Block A	Crescent Walkway @Block A	Lower Concourse outside LT 2@ Block B
	Types of spaces		Space connected to the outside	Space connected to the outside	Space within building
Design Qualities	Spatial Quality	Element	Path	Path	Path
		Human Scale	Monumental Scale (3.7-6.7m)	Intimate Scale (0.5-1.2m)	Intimate Scale (0.5-1.2m)
		Form	- Partially shaded, open form - Outward-looking approach into the surrounding public space	Fully shaded, addition, partially enclosed form	Fully shaded, subtracted form, not enclosed
		Proportion	Large	Small	Small
		Hierarchy	By volume	By level	By size
		Spatial connection	Transitional	Transitional	Node
		Outlook	Open, inviting	Semi-private	Public
		Circulation	Multiple-way circulation	Two-way circulation	Multiple-way circulation
		Material	Robust and natural material	- Rough floor texture - Exposed structure	-Rough floor texture - Exposed structure
	Environmental Quality	Greenery	Able to see wholly	Minimal view	Able to see wholly
		Natural lighting	A mix of natural daylighting and artificial lighting	A mix of natural daylighting and artificial lighting	A mix of natural daylighting and artificial lighting
		Natural Ventilation	Windy	Average wind	Windy
		Weather	Comfortable (partly exposed to the sun or rain)	Comfortable (Sheltered from sun or rain)	Comfortable (partly exposed to the sun or rain)
		Acoustic	Car, fountain sound	Car, talking sound	Birds chirping
Behaviour Setting		Behavioural Pattern	Standing and walking, (active)	Sitting, eating, talking, studying, and chilling around a circular table (passive)	Sitting, eating, talking, studying, and chilling around a square table (passive)
		Types of activity	Necessary	Optional	Optional
		Occupancy frequency	1 to 2 minutes	Less than 30 minutes	20 minutes to 1 hour

Table 3. Tabulation of Spaces in TULC by attributes of design quality.

			Spaces		
	Location		Cafeteria @ Block C1	Breakout Space @ Block C8	Breakout space @Block D8
	Types of spaces		Space within building	Space within building	Space within building
Design Qualities	**Spatial Quality**	**Element**	Node	Node	Node
		Human Scale	Public Scale (2.0-3.0m)	Intimate Scale (0.5-1.2m)	Intimate Scale (0.5-1.2m)
		Form	Partly shaded, enclosed form	Fully open, subtracted form	Fully open, subtracted form
		Proportion	Small	Small	Small
		Hierarchy	By size	By level	By level
		Spatial connection	Node	Node	Node
		Outlook	Open, inviting	Secluded	Secluded
		Circulation	Multiple-way circulation	Two-way circulation	One-way circulation
		Material	- Rough floor texture - Whitewall - Exposed structure	- Smooth floor texture - Coloured wall pattern - Exposed structure	- Smooth floor texture - Coloured wall pattern - Exposed structure
	Environmental Quality	**Greenery**	No, but replaced with a colourful wall	No, but replaced with a colourful wall	No, but replaced with a colourful wall
		Natural lighting	A mix of natural daylighting and artificial lighting	A mix of natural daylighting and artificial lighting	A mix of natural daylighting and artificial lighting
		Natural Ventilation	Free flow of air surrounding the	Windy at times	Usually, windy
		Weather	Comfortable (Sheltered from sun or rain)	Comfortable (Sheltered from sun or rain)	Comfortable (Sheltered from sun or rain)
		Acoustic	Conversation noise	Birds chirping	Birds chirping
Behaviour Setting		**Behavioural Pattern**	Sitting and talking around a circular table (passive)	Sitting, talking, and individual study around a circular table (passive)	Sitting in a row, talking, individual study (passive)
		Types of activity	Necessary	Optional	Optional
		Occupancy frequency	5 to 20 minutes	30 minutes to 1 hour	30 minutes to 1 hour

The legibility of spaces served as an anchor, effectively linking various areas together, with the alignment of space and anchor points further accentuating the captivating lakeside view. Moreover, the degree of spatial organisation, influenced by each architectural design quality, played a pivotal role in shaping the purpose and function of each form of space, thereby supporting students' social learning experiences. Notably, landmarks with precise form and location proved indispensable in guiding students' orientation, exemplified by the distinctive convex-shaped amphitheatre that left a lasting impression and imbued the environment with a unique identity.

4.2. Functionality

In the informal shared spaces between buildings, the most effective design quality was the human scale and the degree of enclosure. The space had first to fulfil physical needs. Among the nine spaces studied, students highly preferred spaces between buildings, as they offered partial enclosure. The articulation of space aimed to provide shelter and protection from the sun or rain. Aesthetics came into play only after fulfilling these physical needs, creating a pleasurable and memorable experience that gave meaning to the place.

Functionality was the highest priority based on the findings from the informal shared spaces within buildings. Each building block in TULC was clearly defined to cater to specific faculties. The fully open and subtracted spaces acted as breathable areas with learning opportunities, as the underused spaces could be utilised by providing food and beverages, meeting human physiological needs. However, the intensity of the social unit within each academic block segregated students from other faculties. This type of shared space was most effective for individual and group learning on a smaller scale. Visual cues in the space were usually planned as nodes where junctions and columns created opportunities to pause.

The spaces were connected/adjacent to the outside, indoor and outdoor, in TULC experienced the most pedestrian traffic flow. The campus had a range of interconnected indoor and outdoor spaces, each with different spatial qualities and characteristics that triggered different types of activities. The spatial connection and sense of connectedness within and between street networks influenced interpersonal engagement and participation, providing insights into how students felt connected to the campus community. Overall, the most prominent design quality was the enclosure form of the space. The fully open, partially shaded, and subtracted forms with enclosures were intentionally planned to offer user comfort. The analysis of the seating behaviour of students showed that open shared spaces encouraged social interaction among students, leading to behavioural and attitude changes. The results showed that the majority of students tended to sit alone and segregated, and these sitting patterns tended to be consistent.

In the diverse informal shared spaces studied, the design details of the spaces and the location or type of space influenced their utilisation, supporting earlier theses of Marcus and Francis [10]. While each space may have differed, the commonality seemed to be the flexibility of the function, comfort, and conduciveness, which were highly espoused spatial attributes of informal learning spaces [11-13].

4.3. Connectivity

The second most prominent design quality was the visual connection and openness of the space. Students used shortcut paths, such as the university square or the link bridge near the breakout space opposite the Tiffin kiosk when available, to reach their destination. Most spaces had multiple access circulation, creating incidental encounters and informal gatherings, unobstructed with greenery views. For example, the breakout space outside Student Life Centre exemplified open shared spaces that lie between formality and informality. The temporal activity, incidental social interaction among students, and environmental influences were revealed in the flow of space, forming personal and visual connections with the environment and encouraging students to spend time or engage in group discussions.

The connection and transitional space could be a third place, a term coined by Oldenburg, which was essential for establishing social interaction and feelings of a sense of place [8]. The idea of openness was reflected in the building enclosure form. Each space offered a variety of features that some students found engaging while others did not. For example, the Level 8 breakout space on the top floor of Taylor's academic block was in a secluded corner with little traffic, offering a great view and different types of desk spaces context. The incorporation of natural elements of regeneration helped attract students' interest and provided a momentary break, addressing students' needs in learning, reinforcing the positive connotations of greenery, as espoused by Speake et al. [16], Liu et al. [17], and Seitz [18]. The lakeside campus gave an identity to a place where students could feel a sense of belonging, consistent with earlier research by Altimare and Sheridan [2].

The connectivity of space increased the perception of a sense of belonging, as social participation was mentioned by Lickona and Davidson [6]. The flexibility of design and diverse use of space led to a trustworthy feeling, fostering social sustainability and a desirable sense of community in HEI. A space with high connectivity tended to have higher movement flow, pedestrian traffic, and a high revisiting frequency. On the other hand, segregated spaces and those not easily identified resulted in a low rate of movement.

The analysis of the relationship between person-environment-behaviour revealed that careful consideration must be given to all three elements and their interconnections. The overall findings reinforced earlier studies on the spatial [14] and environmental [15] qualities of spaces that contributed to students' sense of community, emphasising the importance of the form of space. User-oriented spaces needed to be established first, and the role of legibility encouraged students' learning exploration. The environment should have been designed for its function, allowing students to direct their activities and striking a balance between structure and flexibility for individual and group learning. The environment provided opportunities for individuals to pursue what they valued doing, offering motivation for learning. Additionally, visibility was essential to provide protection and security to students. After addressing physical and safety needs, social needs should have been considered to increase students' social learning productivity.

5. Conclusion

This study concluded that the relationship between person-environment-behaviour was equally important, but a person's motives led to using space and the

environment allowed for it. The environment should first be designed for its function and allow students to direct their activities; it was designed with a balance of structure and flexibility for individual learning to group learning by not enclosing or limiting too many design features, open shared spaces allowed for creativity and a sense of belonging to foster the sense of community.

Design qualities of the informal shared spaces included the scale of open shared space, visual connection, form of circulation, comfort, and enclosure form, which affected students' social learning experience. The transformative learning process was connected to the social dimension. The hierarchy of shape by size and shape and the intersection of space created human nodes where social cohesion could occur.

While this study established that behaviour setting observation and mapping enabled the analysis of the person-environment-behaviour relationship, the case used was limited to the study on one private university urban campus in Malaysia. Future research was recommended to address broader types of campuses, learning environments, and other types of spaces within the university. Using empirical research to evaluate the effectiveness of different types of open shared spaces would help determine the most effective types of space.

Abbreviations	
HEI	Higher Education Institution
TULC	Taylor's University Lakeside Campus TULC

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