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The Impact of the Spatial-Cultural Elements of Fujian Tulou on University Dormitory Identity

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Abstract

Fujian Tulou are multi-story, enclosed buildings with distinct inner and peripheral zoning and strong cultural significance, which have long provided their residents with a sense of security, clan support, and a vessel of collective memory. It is thus considered that drawing inspiration from spatial-cultural elements of Tulou in the design of college dormitories helps enhance students' sense of safety, increase their social opportunities, and finally foster their dormitory identity. But current practices indicate that a mere replication in form cannot necessarily ensure long-term identity; more research is needed to clarify the relationship between morphology, experience, and governance. To address this problem, this study integrated three theories-Maslow's hierarchy of needs, environmental psychology, and place attachment-to propose an initial theoretical model of "physical conditions ⟶ experiential process ⟶ emotional connection ⟶ identity formation." Then, identifying six key spatial-cultural elements from existing Tulou literature and conducting qualitative comparative studies on three Tulou-inspired dormitory cases. The results showed that typical Tulou spatial-cultural features possess the potential to promote dormitory identity, but only when supported by proper management and regular communal and cultural activities can this potential translate into long-term identity. Accordingly, actionable recommendations for design, management, and policymaking were proposed to achieve sustained dormitory identity among students.

Keywords: Student Housing, Maslow's Hierarchy of Needs, Environmental Psychology, Fujian Tulou, Place Attachment

1. Introduction

Apart from basic accommodation functions, college dormitories serve as a crucial venue for students' daily learning, social interaction, and their identity formation. Currently, enrollment in higher education continues to expand, and the students' lifestyle is becoming more and more diversified, which together lead to a weakening trend in students' sense of belonging to their dormitories. This not only impacts students' mental health but is also critically connected to the efficacy of on-campus academic support and management. However, existing research on dormitories largely investigates the impact of environmental quality on students' living experiences (Simpeh & Shakantu, 2020) or, from the perspective of functional configuration, emphasizes that enhanced dormitory conditions can markedly improve students' satisfaction and their academic performance (Reynolds, 2020; Ulyani Mohd Najib et al., 2011). The current literature is deficient in explanatory pathways regarding "how architectural forms specifically foster dormitory identity through experiential mechanisms."

To address this gap, we focused our research on Fujian Tulou, a renowned traditional residence type in China. Fujian Tulou, with their unique architectural morphology, distinct spatial layers, and profound cultural significance, provide their residents with a strong sense of security and collective identity (Huang, 2019). If the spatial-cultural elements of Tulou could be properly borrowed for the design of college dormitories, they would provide a basis for enhancing students' sense of security, social life, and identity expression. However, in some existing Tulou-style dormitories, merely copying the form has not explicitly evoked a long-term identity, which underscores the need to clarify the specific factors that transform morphological potential into sustained identity. In this light, we conducted a systematic theoretical integration and case studies of three Tulou-styled projects, aiming to reveal the specific Tulou elements that are able to influence dormitory identity among college students.

2. Research Objectives

Through a general study of current literature and theories and a comparative analysis of three Tulou-inspired cases, we propose the following corresponding research objectives:

1) To establish and validate an explanatory theoretical model to illustrate how physical form influences dormitory identity through experiential processes and emotional connections;

2) To identify and systemize key spatial-cultural elements in Fujian Tulou that have potential impacts on dormitory identity and can be referenced in dormitory design; and

3) To reveal how and why morphological potential leads to sustained identity, by comparing different governance and practice conditions in the three case studies

3. Literature Review

3.1 The Needs in College Dormitories

Current research generally finds that the design in university dormitories should be centered on, and adapt to, the diversified needs of the new generation of students. Students' needs in the dormitory can be regarded as key mediating variables in fostering dormitory identity. Based on Maslow's Hierarchy of Needs and previous study on the literature, we categorize dormitory needs into four functional dimensions: academic, social/leisure, managerial, and residential (see Table 1), each of them not only corresponding to objective physical-spatial elements but also correlating to specific experiential indicators (such as interaction frequency, perceived safety, and opportunities for identity expression).

Table 1 University Dormitory Spatial Configuration and Students' Needs

Spatial Configuration	Specific facilities	Corresponding needs
Academic	Study Rooms, Reading Rooms, Seminar Rooms, Resource Libraries, Classrooms, etc.	Learning needs
Social & Leisure	Gym, Calligraphy & Painting Room, Music Room, Student Exhibition Area, Discussion Lounge, Sports Area, etc.	Social needs
Managerial	Meeting Rooms, Offices, Psychological Counseling Room, Security Office, Resident Advisor Accommodation, etc.	Administrative needs
Residential	Water Station, Package Service, Clinic, Storage, Laundry, etc.	Living needs

3.2 Spatial Characteristics of Fujian Tulou

Fujian Tulou are traditional Chinese vernacular dwellings, 45 of which were added to the UNESCO World Heritage List in 2008 (UNESCO World Heritage Centre, 2008). They are enclosed, multi-story buildings, usually circular or square in shape, clearly built with defensive purposes, and renowned for their magnificent scale, unique layout, long history, and socio-cultural value. Each Tulou is home to dozens or even more than 100 households, where residents live, interact, work, and worship together. In addition to private homes, there are various shared areas for different purposes, typically including a common ancestral hall at the center or in the back.

From the outside, the external appearance of Tulou is monumental, giving outsiders a feeling of deterrence and solemnity. In contrast, the internal courtyard features exquisite wooden structures with unified floor heights and column spacing, presenting a harmonious living atmosphere. The cohesive effect of the central ancestral hall not only makes it the visual focus but also symbolizes the unity and harmony of the clan.

In terms of function, typology, and constructive solutions, Colafranceschi et al. (2020) distinguished two large families of Tulou: those typically built by Minnan population, i.e., literally, people of southern Fujian, and those by Hakka population, i.e., a Han Chinese sub-ethnic group, literally meaning 'guest families.' According to their study, Minnan Tulou are arranged into '*unit type*.' Individual units are connected

by interior defensive corridors and separated by load-bearing rammed earth walls, so the room depth is not limited. Due to this structural trait, the diameter of a Minnan Tulou can reach up to 80 meters. Each unit is independent, with a separate entrance and staircase inside the accommodation, together with a private courtyard (often on the ground floor) and an exclusive ancestral hall (on the top floor) in addition to the central common ones. Hakka Tulou, on the other hand, are defined as '*gallery type*,' whose housing units are marked by wooden framework and non-load-bearing adobe partition. Its diameter is usually less than 60 meters with a common ancestral hall at the center. Shared stairs and corridors provide access to private homes. The room depth of this type is subject to the maximum length that can be reached by the load-bearing wooden beams. Due to the limited room depth, the upper sighting balconies are placed in correspondence with the common staircases to save private living space.

3.3 Landscape and site planning in dormitory

Landscape and site planning in dormitory not only provide natural scenery and a central courtyard, but also serve as a medium for social interaction. The natural environment plays a crucial role in supporting students' mental health. Natural elements in the landscape can significantly reduce stress and help students concentrate and recover psychologically (Liu et al., 2022), while natural sounds and biodiversity-rich greenery can further support restorative experiences on campus (Ha & Kim, 2021). Second, courtyard not only provide daylight and ventilation for the building, but also help regulate the thermal comfort of indoor and semi-outdoor spaces. As a passive strategy, courtyards can improve building energy efficiency and reduce energy consumption (Sánchez de la Flor et al., 2021). Finally, these landscapes and spaces also provide outdoor learning areas, semi-public activity spaces, and green areas, which positively affect students' sense of belonging and learning behavior. Therefore, it is necessary to integrate the central courtyard landscape of Tulou into the public landscape space of campus dormitories.

3.4 Theoretical Research on University Dormitories

3.4.1 Environmental Psychology

Environmental psychology took its shape in the 1950s and 1960s (Kühn & Bobeth, 2022). Scholars in this area focus on the rules and interactions between humans, nature, society, and culture, aiming to realize a harmony between environment and human needs. Special attention has been paid to how physical factors (such as lighting, ventilation, noise, enclosure, spatial scale, activity trigger point, etc.), through perception and evaluation, affect people's emotions, behavior choices, and social interaction.

3.4.2 Maslow's Hierarchy of Needs

In 1943, Abraham Maslow initially proposed the model of "hierarchy of needs" to assess the hierarchical needs across various physical and mental dimensions. According to his theory, everyone has five layers of needs to be met. Ranked by importance from low to high, they are biological needs, security needs, social needs, esteem needs, and self-actualization needs. While lower-level needs (survival, safety) are not ensured, higher-level needs are less likely to emerge.

3.4.3 Place Attachment

The theory of "place attachment" focuses on cognitive emotional bonds between individuals and specific spaces, explaining how such bonds take place and strengthen (Low & Altman, 1992; Williams & Stewart, 1998). The essences are: first, there must be a particular place; second, emotional experience must occur; and third, the human-place bonding is the essential characteristic. According to this model, the strengthening of social ties or community membership leads to the emergence of people's sense of belonging and identity (Hidalgo & Hernandez, 2001; Kyle et al., 2004). In other words, people's repeated, meaningful experiences (rituals, shared memories, symbolic objects, etc.) can be gradually internalized as emotional bonds and ultimately externalized, at a collective level, as their sense of recognition and identity.

4. Research Methodology

This study was mainly qualitative, involving the following four steps:

1) Literature review: we reviewed literature on dormitories, Tulou, environmental psychology, place attachment, and Maslow's hierarchy of needs to establish a theoretical foundation for the following steps.

2) Theoretical modeling: we then integrated the above theories to propose an initial model of "physical conditions ⟶ experiential process ⟶ emotional connection ⟶ identity formation" and actionable indicators.

3) Spatial-cultural analysis of Tulou: based on this model, we analyzed the spatial-cultural elements of Tulou and identified six dimensions that are applicable to dormitory design.

4) Case studies: we chose three representative Tulou-inspired cases (two college dormitories and a low-income housing project) and assessed each case against the six spatial-cultural dimensions identified in Step Three, summarizing the evidence with a three-tier rating: 'present,' 'weakly present,' or 'absent.' The evaluation criteria used for case assessment are as follows: "present" indicates that the dimension is clearly observable in the case and functionally complete; "weakly present" indicates that the dimension is partially reflected but incomplete or unstable; and "absent" indicates that the dimension is essentially missing.

5. Research Results

5.1 Establishing the Theoretical Model

In this study, we aim to explain how the spatial-cultural elements of Tulou affect college students' dormitory identity, as well as which intermediate variables are involved in this process. We use three different but related theories to solve these questions. First, environmental psychology elucidates the perception of the physical world and its influence on individuals' spontaneous experiences. Second, Maslow's hierarchy of needs provides a framework for identifying and prioritizing the key needs—from safety and functional amenities to belonging and esteem—that must be sequentially met. Third, place attachment theory describes how this cumulative fulfillment fosters a long-term emotional bond and a

sustained sense of identity. Robust as they are, none of these theories alone fully explains the identity formation process; therefore, their integration provides a framework that both explains the identity-forming potential of spatial forms and accounts for their different outcomes under different governance and cultural contexts.

Environmental psychology, in this study, serves to explain the transformation process from the objective physical factors to subjective experiences. Specifically, typical Tulou features (such as enclosed atrium, controlled access, light wells, and unit scale) are interpreted through sensation and perception as environmental attributes of "safety, openness, privacy, and accessibility." When people feel safe, comfortable, and interaction-friendly in the environment, such perceptions may determine their behaviors, such as staying, socializing, and participating in activities, as well as emotions of relaxation, trust, and belonging. Therefore, environmental psychology is the foundational theory that connects Tulou-style morphology and students' residential experience and provides a basis for quantifying these experiential indicators in the following study.

On the other hand, Maslow's hierarchy of needs is of significant value in two ways. First, it provides an ordering principle for the proposed model, specifying which physical and experiential factors should be prioritized. To be specific, safety and physiological needs corresponding to access control, lighting, and ventilation should be considered before those related to higher-level needs. Second, it serves an explanatory function, clarifying that if people's needs for safety and comfort in a place remain unfulfilled, it is unlikely for this space to trigger a deeper sense of identity. In other words, we posit that when physiological and safety needs are satisfied, modern dormitories with Tulou elements (like a central atrium) can transform their morphological potential into the fulfillment of students' or inhabitants' social and esteem needs, thereby fostering a sustained identity.

The theory of place attachment adds two critical, complementary dimensions, i.e., the time scale and the emotional cumulation. Firstly, it describes the process through which residents internalize and consolidate their sense of identity. When they repeatedly have satisfying experiences in a place, these experiences are solidified in personal and collective memory and symbolized through objects, rituals, or spatial symbols, ultimately forming a stable basis for identity. Secondly, it explains why simple replication of the form cannot ensure sustained identity. In fact, governance, daily cultural activities, and spatial symbols are important factors in translating the morphological potential into long-term identity.

In summary, the integration of these three theories follows this path: Environmental psychology first translates objective physical conditions (enclosure, lighting, access, unit scale, configuration of public facilities, etc.) into perceptible, immediate experiential indicators (perceived safety, comfort, probability of interaction, privacy satisfaction). Maslow's hierarchy of needs is then used to determine the priority of these experiences (physiological and safety needs must be met first, before ascending to social and esteem needs). Finally, place attachment theory explains how these repeated experiences are reinforced and symbolized (through rituals, governance, and memory carriers) and transformed into stable emotional

bonds and identity. In this light, we proposed our initial theoretical model of "physical conditions ⟶ experiential process ⟶ emotional connection ⟶ identity formation."

5.2 Spatial-Cultural Analysis of Fujian Tulou

The vast majority of Fujian Tulou, particularly the circular ones, share a common organization of "three-layer concentric circles": an outer ring of solid, enclosing walls with defensive features; a middle circle housing residential quarters; and an inner area that typically incorporates either an open courtyard (sky well) or a covered hall for worship purpose. This layout establishes a spatial system that is closed on the periphery, residential in the middle zone, and communal and cultural at the core, as shown in Chengqi Lou, a representative circular Hakka Tulou (Figure 1 and 2).

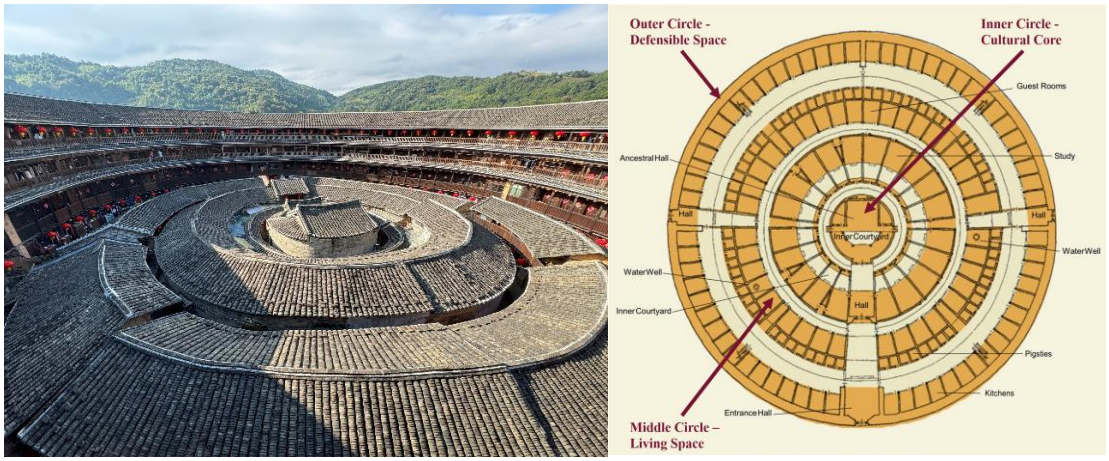

Figure 1 "Three-Layer Concentric Circle" Pattern of Chengqi Lou (Photograph taken by Junkai, Y.) and Layout Diagram (Huang, 2019)

As illustrated in the diagram on the right of Figure one, the outer circle serves defensive purposes, deploying linear installations (exterior walls, gateways, window openings, watchtowers, shooting holes, etc.), forming the primary barrier.

The middle circle is primarily the living area containing dwelling units (such as bedrooms, kitchens, living rooms, storage, staircases, etc.) with wells, toilets, and bathrooms located closer to the inner side of this layer.

And the inner circle is the cultural core of the building complex: the central space is often a covered ancestral hall or shrine for cultural and religious activities (in other cases it can be an open, shared courtyard) representing the core area of the most cohesive significance (Figure 2). The inner circle of Fujian Tulou is not only the cultural center of the building, but also a multifunctional landscape system. It not only meets residents' social needs, but also helps regulate the environment. As a visual focal point and a venue for ritual activities, it is shaped by paving, plants, benches, and wells, which facilitate daily communication and gatherings. It can also improve the microclimate and air circulation through shading and water evaporation. In this sense, it plays an important role in landscape, ecology, and social interaction alike.



Figure 2 The Outer, Middle, and Inner Circles of Chengqi Lou (Photograph taken by Junkai, Y.)

To summarize, Tulou are not just simple dwellings but architectural complexes that combine three complementary functions of defense, residence, and cultural heritage. Communal residence provides material sources and human support for defensive and cultural activities; in return, the fortified defense system creates a secure and stable environment for both residence and cultural heritage; regular cultural activities aggregate individual experiences into collective wisdom and identity. These three functions are interdependent and mutually reinforcing, collectively underpinning the emergence and development of Tulou as a monumental building type for centuries. Based on the theoretical framework of "physical conditions ⟶ experiential process ⟶ emotional connection ⟶ identity formation," we derived six key spatial-cultural elements of Tulou that may promote dormitory identity among university students, along with their underlying mechanisms:

1) Enclosed layout and psychological comfort

From a landscape design perspective, the outer wall of the earthen building not only serves a defensive function, but also clearly defines the site boundary: the interior is the living space, while the exterior consists of surrounding farmland and public areas. The boundary becomes legible through the entrance, ground paving, and greenery. The circular, enclosed layout of Tulou distinctly defines the boundary between inside and outside, strengthening the sense of security and group identity. College dormitories can borrow this enclosure strategy. Inside such an enclosed structure, designers can arrange various shared areas, such as central courtyards, lounges, and stepped corridors, to form smaller, independent subunits, which helps freshmen foster a sense of belonging within the new groups. At the same time, this comfortable layout can help reduce freshmen's anxiety and feelings of strangeness during their adaptation period.

2) Balance between privacy and socialization

According to Altman's (1975) privacy regulation theory, the Tulou layout (individual family units, central courtyard, and other shared areas) ensures privacy while offering venues for socialization. Dormitory designers should clearly define the difference between private areas and shared zones, which allows students to easily switch between solitude and social interaction.

3) Physical protection and perceived safety

The physical defensive elements (for example, the solid rammed earth exterior walls and single access control) provide the Tulou community with a strong sense of security. We can combine these physical elements with Newman's (1973) defensible space theory through design choices such as optimizing the access control and monitoring zones, creating welcoming entrances, and ensuring clear unit markers. These settings not only help with smooth management but, more importantly, enhance students' perceived safety and foster trust, both of which are essential for sustained dormitory identity.

4) Proper natural lighting and ventilation

Central courtyards, light wells, and circular corridors bring advantages in natural lighting and ventilation. Sufficient daylight and proper ventilation have positive effects on Tulou residents' mood, concentration, and physical well-being. Therefore, we suggest introducing atria, skylights, and vertical light wells into college dormitories and optimizing airflow paths to enhance students' living experience and foster a stronger dormitory identity. In addition to the building's lighting and ventilation, courtyard layout is also crucial. For example, planting tall trees, shrubs, and lawns can create a layered landscape while providing shade; introducing water features can help regulate courtyard temperature through evaporation; and placing benches along main circulation routes can encourage outdoor communication and learning. This is not only an integration of ecological landscape elements, but also a way to strengthen students' social interaction.

5) Spatial symbolism and identity

Some Tulou elements, such as spatial morphology, decorations, and traditional lifestyles, bear residents' collective memory and establish their identity. Similarly, dormitory design can create some shared spaces with ritualistic qualities and include the symbols of university culture into these places. Doing so can strengthen the symbolism of a "residential community" and enhance students' collective identity.

6) Public space and social support network

In Tulou, shared kitchens and other public places provide residents with venues for high-frequency interaction, thus fostering mutual help and social support among neighbors. Place attachment theory has proved that an emotional bond to a place can relieve stress and improve mental health (Jorgensen et al., 2007). In the context of college students, convenient daily interaction can help them build a network of mutual trust and support, thereby fostering the dormitory identity.

5.3 Comparative Case Studies

5.3.1 Dormitories of the National Cybersecurity School (Wuhan, China)

The first studied site is the student dormitories of the National Cybersecurity School (NCS, see Figure 3), a subunit of China's National Cybersecurity Talent and Innovation Base located in Wuhan.



Figure 3 Dormitories of the National Cybersecurity School (Photograph taken by Junkai, Y.)

Within the base, there are six buildings highly resembling the form of circular Tulou, and three of them are seven-story student dormitories (Figure 4). On the ground floor are commercial and service facilities (e.g., supermarkets, convenience stores, fruit shops, and parcel services), while floors two through seven are all dedicated to student accommodation, featuring a "two-units-per-staircase" layout. Each unit is made of three double rooms, three single rooms, and common areas including a lounge, a balcony, a kitchen, and a shared bathroom. The student rooms are furnished with natural wood-colored desks, chairs, beds, and wardrobes and equipped with central air conditioning. The dormitory allows for access through a smart system via five options (i.e., fingerprint, PIN code, facial recognition, key card, and physical key.)



Figure 3 Dormitories of the National Cybersecurity School (Photograph taken by Junkai, Y.)

In summary, the ground floor shops provide convenience in daily life, while the up-to-date access control system ensures a safe environment. The upper-floor layout, on the other hand, highlights the balance between privacy and socialization. The overall enclosed, circular morphology visually gives students a sense of unity, while the central courtyard and common corridors provide ample space and opportunities to meet students' needs in self-learning and social interaction.

5.3.2 Tulou Collective Housing (Guangdong, China)

The second site we studied is Tulou Collective Housing (Figure 5), an affordable housing project designed by Urbanus and backed by local government. With the core design concept of "collective living and community," it is a project that combines the traditional Hakka culture with contemporary urban living. Residential units, shops, and public recreational facilities are seamlessly arranged in a Tulou style, aiming not just to preserve the spatial and cultural wisdom in Hakka Tulou but to adapt this traditional architectural form to the modern context.



Figure 4 Tulou Collective Housing (URNABUS, 2008)

This six-floor complex occupies a site area of approximately 9,000 m² and a total floor area of about 12,000 m² (plot ratio 1.33), with its diameter reaching 72 meters. The ground floor alone covers approximately 2,000 m² (about one-sixth of the total floor area), all dedicated to shared facilities including a library, an exhibition hall, a table tennis room, a computer room, and training rooms. The whole building contains 285 residential units with a maximum capacity of about 1,800 residents. Its layout features an asymmetrical pattern of "circular enclosure surrounding a rectangular core." Spiral volumes and corridors connect the outer and inner structures and divide the interior area into several courtyards and a central atrium. Benches, trees, plants, and decorations are carefully arranged along the paths or in the yards, all of which add to the amenities (Figure 6).



Figure 5 Inside the Collective Housing (URBANUS, 2008)

Spatially, the overall layout of the project draws inspiration from the circular Hakka Tulou. It adopts annular corridors to connect about 60 residential units and multiple courtyards, creating a gradual, layered transition from open to semi-open to private spaces. Besides, abundant courtyards and convenient facilities encourage extended stays and provide opportunities for casual encounters and communication among neighbors.

The targeted tenants of this collective housing are primarily low-income migrant workers from different backgrounds, so the entry standards remain comparatively low. To cut costs, the property does

not employ an external management team but instead encourages tenants to volunteer in safety patrols, environmental maintenance, and other cultural activities in return for rent reduction or service fees. In this way, residents are more willing to engage in community activities and interact with each other.

Beyond daily administration, tenants have also elected representatives for themselves to form a committee from themselves, making and monitoring community rules. These practices incorporate the Hakka traditions in maintaining clan order—through shared responsibility and interaction, this model of co-governance lowers managerial costs and simultaneously cultivates a sense of ownership and collective identity.

5.3.3 Tietgenkollegiet (Copenhagen)

Located near the campus of Copenhagen University, the Tietgenkollegiet (also known as the Tietgen Dormitory) was designed by Lundgaard & Tranberg Architects and was completed in 2006. The project directly draws inspiration from Fujian Tulou: its circular form symbolizes equality and integration; the varied window openings and terraces, big or small, provide each residential unit with a "private balcony". The building has seven stories, covering a total floor area of approximately 26,800 m². On the upper floors are 360 residential units, while the central garden is surrounded by a circular path and ground-floor rooms of various public or recreational functions (Figure 7).



Figure 6 Tietgenkollegiet (ArchDaily, 2014)

From the perspective of spatial organization, the dormitory, on the one hand, strengthens the sense of community: its enclosed form and the central garden gather public activities inward; on the other hand, variations in the facade details, such as the staggered window openings and stepped terraces, create intriguing changes in scale and sightlines and cater to students' needs for individuality and privacy. Together, the design achieves a balance between communal life and personal space.

Apart from individual units, the dormitory complex offers three types of shared functions. Inside the outer ring, the central garden and small plaza serve as primary circulation routes and venues for large events. Moving to the ground floor, common facilities (e.g., study rooms, computer labs, music rooms, bicycle storage, a mailroom, and a laundry room) provide essential daily services for all residents. Finally, the building's overall ring form is segmented by access points and vertical circulation into five vertical sections, thus defining the same number of smaller social clusters on every floor. Each cluster comprises

twelve single or double rooms sharing an open kitchen, a dining area, a common lounge, an integrated study space, and an outdoor split-level terrace (Figure 8).



Figure 7 Terraces of Tietgenkollegiet (ArchDaily, 2014)

As for individual rooms, they are staggered and fan-shaped, available for single or double occupancy in four sizes: 26 m², 29 m², 33 m², and 42 m². Each unit contains a bathroom, with the desk and bed arranged along one wall, leaving the opposite side as a flexible zone that can be adapted for entertainment, fitness, or a small dining area.

Compared with China's NCS and Tulou Collective Housing, Denmark's Tietgenkollegiet reflects a different design logic. The building is more open and less enclosed, which is consistent with Denmark's strong emphasis on personal autonomy and a rational public culture. Here, community activities are mainly promoted by small-scale "life groups" and student-run associations. The public spaces provide the venue, but actual collective activities depend on students' own organization and the support of the school. This suggests that the same spatial design can function differently in different cultural contexts. In China, collective life is more often organized through explicit management rules; in Denmark, it relies more on spontaneous student organization, making sharing a more natural practice.

5.3.4 Comparative Analysis of Cases

We evaluated the three cases against the six spatial-cultural dimensions of Fujian Tulou and summarized the assessment along with the supporting evidence for each rating (Table 2).

As we observed, the NCS dormitory adopts a nearly identical layout to Tulou. Its circular atrium, controlled access, individual suites, and shared areas address safety and meet physiological needs, while the symbolic exterior strengthens students' sense of identity. The Tulou Collective Housing also highly resembles traditional Tulou in terms of morphology and communal culture. By integrating design, function, and governance, this case has successfully translated the morphological potential into long-term place attachment. The Tietgen Dormitory, on the other hand, draws on the typical unit-type of Minnan Tulou, incorporating a circular atrium and a variety of facilities shared by small groups or the whole community.

Despite its positive effects on residents' social interactions and esteem needs, we noticed that this modern project emphasizes openness, accessibility, and visual connectivity rather than the defensive character typical of Tulou, and thus somewhat lacks clear physical security features.

Table 2 Case Evaluation Matrix of Six Dimensions of Tulou Spatial Culture

Dimension	NCS Dormitory	Tulou Collective Housing	Tietgen Dormitory	Key Evidence
Enclosed layout	✓	✓	✓ (more open)	Design plans (atrium, circular layout, etc.)
Privacy & socialization	✓	✓	✓ (floor-level clusters)	Suite + shared area; small unit design, etc.
protection and safety	✓ (controlled access)	✓ (self-governance + management)	✓ (openness)	exterior, access control, and management
Lighting & ventilation	✓	✓	✓	Atrium, skylights, and balconies
Spatial symbolism & identity	✓ (highly symbolic)	✓(community culture)	✓ (group culture)	governance and activities
Public space & social support	✓	✓ (well-equipped)	✓	lounges, kitchens, activity rooms, etc.

(Note: ✓ = present, ✓ = weakly present, and × = absent)

There are three main reasons for the differences shown in Table 2. First, cultural orientation matters: China places greater emphasis on collectivism, whereas Europe and the United States place more emphasis on individualism, which shapes expectations for and participation in shared spaces. Second, the governance model matters, whether public space is managed by property management or through self-organization, because this determines the frequency and order of use. Third, the design philosophy matters, whether it emphasizes enclosure and privacy or openness and transparency, which affects whether public spaces can attract social interaction. In short, if these three factors are appropriately aligned, public spaces can remain active over time and become places that people truly recognize and identify with.

Through comparative analysis summarized in Table 2, we found that the key differentiator among the cases lies in the normalization of governance and cultural activities: when governance mechanisms operate in parallel with physical morphology, the translation from "morphological potential" to "sustained identity" is more readily achieved. Physical conditions, in this process, influence identity through three primary factors: immediate experience (sense of safety, comfort), interactive behavior (frequent interactions fostering trust), and symbolization (spatial elements being assigned meaning and entering collective memory). Governance and regular cultural activities are necessary conditions for consolidating these factors. Conversely, simple formal replication or morphological borrowing, in the absence of supportive governance, is unlikely to foster long-term identity among residents.

6. Discussion and Conclusion

This study integrates environmental psychology (explaining how physical elements are perceived and shape immediate experience), Maslow's hierarchy of needs (providing a framework for motivational priorities), and place attachment theory (describing the cumulative mechanism of emotional bonds over time) to construct a model of "physical conditions ⟶ experiential process ⟶ emotional connection ⟶ identity formation." This model explains why specific features (such as enclosed atria, access controls, private versus shared space arrangements, etc.) enhance students' safety and their frequency of interaction. It also accounts for why the sense of identity emerges only when physical spaces are properly supported by regular governance and cultural activities. This addresses the gap in prior research. Our findings align with studies on indoor environmental quality and facility configuration (Reynolds, 2020; Simpeh & Shakantu, 2020) in confirming the importance of comfort, safety, and accessibility of public spaces to immediate experience and satisfaction. They are also consistent with the classic logic of emotional accumulation in place attachment research (Low & Altman, 1992; Williams & Stewart, 1998). However, our results diverge from practical studies that assume the "direct transplantation" of traditional forms can readily replicate community identity. The case comparisons reveal that mere formal mimicry often leads only to short-term effects, whereas the advantages of a morphological design are amplified and internalized as collective memory only when design, governance, and daily activities function together.

To better help students develop a sense of belonging to their dormitory, colleges and universities are recommended to adopt the following three strategies:

Normalized ceremonies and activities: establish fixed activities each semester, such as orientation, traditional festivals, and dormitory cultural events. The school should provide venues and financial support to ensure the creation of symbolic memories;

Hybrid governance model: combine school management services with student autonomy. The school is responsible for basic support, while specific public affairs are delegated to students, such as duty rotation and daily maintenance, as well as the establishment of a dormitory community committee. Incentives can then be introduced—for example, small subsidies or priority access to activity rooms for those on duty—to strengthen students' sense of responsibility;

Material and memory-based emotional connection: establish memory walls, student work exhibitions, and collective logos in the core public space, and preserve memory through long-term exhibitions and the accumulation of works.

In terms of design, we suggest that when drawing inspiration from Tulou, priority be given to meeting physiological and safety needs—through rational access control, convenient amenities, and adequate lighting and ventilation—to provide a "safe and comfortable" environment, while also designing transitions from private to social spaces. At the same time, the above three strategies should be implemented in parallel with the design, for example, by reserving activity areas in the courtyard, installing display walls and flexible seating, to ensure that the governance strategy is reflected at the material level.

In this study, we explored the influence of Fujian Tulou's spatial-cultural elements on university dormitory identity, and conducted three comparative case studies. The value of the research lies in three aspects. First, we proposed and preliminarily validated the theoretical model of "physical conditions ⟶ experiential process ⟶ emotional connection ⟶ identity formation," providing an operational framework for further study. This model bridges the gap between morphological research and emotional attachment and helps address the limitations of single-perspective studies based solely on morphology or psychology. Second, we developed six operational evaluation indicators. Researchers conducting similar studies in the future can use this indicator system to analyze different cases and conduct comparative verification. Third, governance and routine cultural activities are key conditions for translating physical space into sustained identity. We therefore propose an integrated dormitory design strategy that moves from simple formal imitation to "design + governance + cultural practice," along with implementable governance strategies and site-planning suggestions, so that the wisdom of traditional architecture is not reduced to mere formal imitation, but instead becomes a set of long-term management methods that can genuinely help students develop a sense of belonging.

This study is primarily a qualitative comparison and theoretical construction and has the following limitations. The sample is literature- and case-based, lacking large-scale quantitative data. The cases are mostly exemplary projects and are culture-context specific. The measurement indicators require reliability and validity testing across different cultural and campus environments. Future research in theory and methodology could conduct large-sample questionnaires and structural equation modeling to test the proposed model, and employ longitudinal surveys to track the development of students' place attachment and the impact of governance or activity interventions.

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