

Belonging as infrastructure: How campus environment design shapes sense of belonging among marginalized students

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Abstract

The campus environment is much more than just the backdrop against which students study; it is a crucial factor in determining whether students feel they belong or are only tolerated. In this paper, it will be argued that while belonging may appear to be a psychological phenomenon that can be engineered institutionally, it is actually something that is either facilitated or denied through space, architecture, symbolism, and politics of design. Based on recent research findings, critical theory, and emerging best practices in higher education planning, the role of campus environment design, ranging from classroom design to wayfinding, gender-inclusive facilities, and culturally symbolic murals, in mediating the experience of belonging among racially marginalized, first-generation, LGBTQIA+, disabled, and religiously diverse students will be analyzed. It will also be argued that institutions that see space as neutral are, in fact, making a political decision, and that true inclusion requires a radical reconceptualization of campus design. The paper contributes to the literature on higher education studies, student development theory, and spatial justice.

Keywords: Sense of belonging; Campus design; Marginalized students; Inclusive architecture; Higher education; Spatial justice; DEI; Campus climate

1. Introduction: When Space Speaks Before Anyone Does

There exists a feeling that students belonging to marginalized groups experience when they first set foot on the grounds of their university campus. There are some who describe the feeling of walking into large rooms filled with pictures of men who do not look like them. Others try to locate a bathroom where they will not be under any surveillance, observation, or even intimidation. A student of the first generation from a rural area may find herself standing outside a large research center without knowing whether she belongs there. This does not occur on the fringes but takes place frequently, before taking any classes or meeting any professors.

Belongingness in higher education has been an issue of great interest among academics and institutions over the past two decades. Belongingness, which can be defined as the feeling of being valued, respected, and welcomed in a community, has been proven to be consistently associated with students' retention, psychological well-being, and completion rate, especially those belonging to marginalized communities (Strayhorn, 2019; Hurtado & Carter, 1997). However, when it comes to addressing the problem of belongingness, the majority of frameworks have focused on personal connections, curricular inclusion, and support programs for students. On the other hand, the aspect of the physical environment, which means the real spaces where students move around and spend their time, has not been explored extensively by the mainstream discourse in higher education, despite the efforts of architects and planners to make it known that space is never neutral.

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In essence, this article argues that campus architecture acts as infrastructure for belonging in much the same way as highways and sewage systems act as infrastructure for community life: invisible when it succeeds but glaring when it fails and with profound consequences for the populations who suffer the most from its inadequacies. This article explores this idea with reference to an extensive literature base in areas ranging from student development theory and environmental psychology to critical race theory, disability studies, and inclusive design. But it also touches on some of the latest trends in the field, such as the increasing prevalence of gender-neutral bathrooms, the deliberate use of cultural murals and ethnic resource centers, the reconsideration of shared spaces in the wake of the pandemic, and the new language of neurodiversity and sensory design.

2. Theoretical Grounding: Space, Power, and the Construction of Belonging

2.1. Sense of Belonging in Higher Education

Belonging is an old theme in educational research. It was discussed by Abraham Maslow in his famous hierarchy of needs and has been considered an important determinant of success for college students in educational studies. Perhaps, the most cited modern discussion of this concept is found in the works of Terrell Strayhorn, who presents belonging as a fundamental human need and an important element of motivational process. As Strayhorn (2019) defines in his book, the notion of belonging refers to students' perception of social support provided at the college, as well as a sensation of connectedness and mattering, being cared about, respected, valued by, and important for the group, which may be a classroom, residential college community, or even the institution as a whole.

Strayhorn, among others, has highlighted the fact that this sense is not evenly distributed across all students. Students who belong to underrepresented racial and ethnic minorities, first-generation students, LGBT students, disabled students, and students from poor families tend to have significantly lower levels of belonging at campuses that are predominantly white or otherwise narrowly demographically characterized (Vaccaro et al., 2015; Strayhorn, 2019; Murphy & Zirkel, 2015). In a national-level study conducted by the Healthy Minds Network, it was found that belonging was significantly influenced by identity with minorities and first-generation students having relatively low levels of belonging irrespective of other factors such as academic success (PMC, 2024).

2.2. The Political Life of Campus Space

The notion of space being socially constructed, and not neutral, is a concept with deep origins in critical human geography and sociology. The groundbreaking work of Henri Lefebvre, who argued that space is not a vessel where social relations take place but a medium through which social relations are reproduced (Lefebvre, 1991), set the stage for a long line of research on how the environment represents power. This plays out on university campuses in everything from whose history is celebrated in sculptures and building names, to whose body type is assumed in the construction of classrooms, bathrooms, and dorms.

Scholars working at the intersection of critical race theory and higher education have shown that campus spaces communicate institutional values and assumptions to students in ways that precede formal policy. When a campus's public art overwhelmingly depicts white, male founders and benefactors, when its oldest and most prestigious buildings bear the names of slaveholders or colonizers, when its common spaces feel designed for a kind of student that does not include you, the implicit message is one of conditional welcome at best (Museus, 2014). This is not merely symbolic: research has demonstrated that exposure to institutional symbols that reflect historical exclusion can suppress belonging and academic performance among marginalized students (Cheryan et al., 2009).

The physical environment thus operates alongside policy and curriculum as a dimension of campus climate, understood as the overall set of conditions that determine whether a student perceives the institution as hostile, neutral, or genuinely welcoming. A campus climate that is intellectually affirming on paper but spatially exclusionary in practice produces belonging deficits that no amount of programming can fully compensate for.

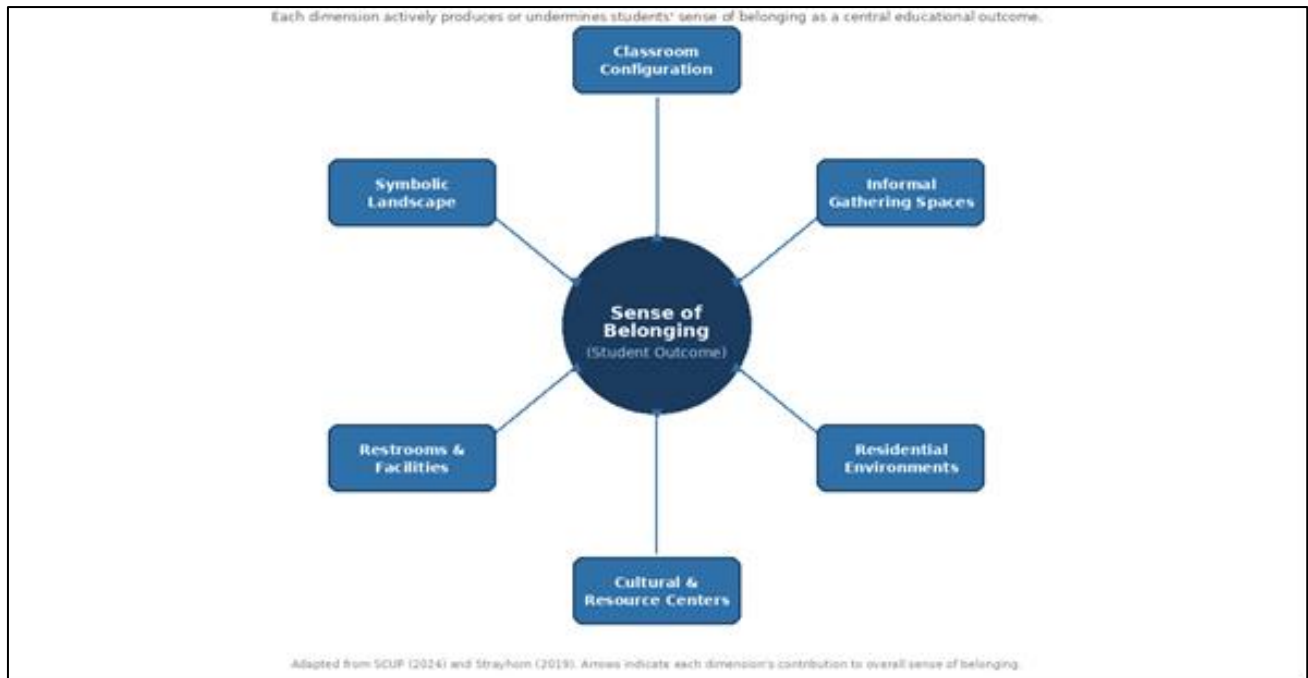


Figure 1 Belonging as infrastructure: Six Spatial Dimensions of Campus Design

3. Design Elements and Their Effects on Marginalized Students

3.1. Classrooms and Formal Learning Spaces

For the majority of students, classrooms will still be the primary setting in which they will receive their education, and there are many meanings associated with classroom design that pertain to engagement, performance, and identity. Research carried out by environmental psychologists and educators has supported the importance of learning space design, indicating that it significantly contributes to how engaged students feel, how willing they are to participate, and how visible they are. Lecture theaters that contain fixed seating, a lectern, and little opportunity for change will communicate the traditional knowledge structure in a way that may be problematic for some students.

The movement toward active learning classrooms, characterised by movable furniture, round or flexible table configurations, writable surfaces, and technology integration, was intended in part to address these dynamics by reducing the symbolic power gradient between instructors and students. However, recent research has introduced an important complication: active learning pedagogies do not automatically produce more equitable participation, and can in some cases increase instances of exclusion for marginalized students, particularly when small group dynamics are not carefully monitored by instructors (Maries et al., 2024). This finding is a useful corrective to any technological determinism about design. The physical environment creates affordances and possibilities, but human facilitation remains essential.

The classroom accessibility of students with disabilities is especially vital when considering this topic. Even though there are laws such as the Americans with Disabilities Act and similar laws in other countries, most classrooms on college campuses are either inaccessible or barely accessible, providing ramps to buildings leading to seating with no space left for wheelchairs or lighting that makes studying hard for students with some visual impairments or sensory issues. The rise in the number of neurodiverse students in colleges has highlighted the sensory aspects of learning spaces; lighting levels, acoustics, and the provision of quiet environments are now seen as essential infrastructure features.

Table 1 Campus Design Elements and Their Belonging Implications by Student Group

Design Element	Racial/Ethnic Minority Students	LGBTQ+ Students	First-Gen & Low-Income Students	Students with Disabilities
Classroom Configuration	Low representation in active-learning groups; fixed seating signals exclusion	Hostile small-group dynamics if identity not affirmed	Unfamiliar pedagogical norms; limited prior access to active learning	Fixed seating often inaccessible; poor acoustics; lighting barriers
Symbolic Landscape (Art, Names)	Absence of cultural representation; colonial monuments reinforce exclusion	Erasure of LGBTQ+ history from public commemoration	No visible role models from similar backgrounds	Disabled figures rarely depicted in campus art or naming
Restrooms & Changing Facilities	Generally neutral; racial harassment documented in shared spaces	Binary-only facilities create safety risk and daily anxiety	Basic needs dimension; menstrual product access matters for low-income students	Accessibility compliance often nominal rather than genuine
Cultural & Resource Centers	Ethnic centers provide critical spatial anchor and community refuge	LGBTQ+ resource offices essential; location and visibility signal institutional priority	First-gen centers and basic needs hubs directly tied to persistence	Disability resource offices; stigma reduced by central, visible placement
Residential Environments	Racial isolation in dorms; living-learning communities improve outcomes	Housing that ignores gender identity creates daily belonging deficit	First-gen students disproportionately affected by inadequate shared spaces	Sensory design in shared spaces; accessible room configurations critical
Informal Gathering Spaces	Comfort in common areas lower when cultural norms of space feel exclusionary	Safe social spaces absent if LGBTQ+ presence not visibly welcomed	Campus common areas substitute for resources unavailable off-campus	Sensory overload in open-plan areas; quiet zones are belonging infrastructure

Note. Checkmarks and descriptors indicate documented belonging-related impacts. Sources: Strayhorn (2019); Samura (2016); Maries et al. (2024); Vaccaro et al. (2015); EAB (2024); Shepley Bulfinch (2025); SCUP (2024).

3.2. Residence Halls and Living Environments

For students who attend college on a residency basis, the residential space is possibly the most intimate element of the spatial experience at their institution. According to the research conducted by Michelle Samura (2016) into residence hall spaces, the design of the residential space was influential in shaping the sense of belonging that students felt. Students who were not-white or first-generation students reported feelings of being isolated and feeling like outsiders in residential settings that were not designed with their existence in mind. The common areas of residences, such as lounge spaces and kitchen spaces, assumed certain cultural norms of behavior, eating practices, and religion.

A number of universities have tested the use of thematic learning communities based on cultural or academic affinity as a mechanism for increasing belongingness of the underrepresented students. There is largely favorable literature on this approach, with students who were residing in such environments reporting a greater sense of belonging, enhanced peer relationships, and better academic performance. However, some scholars have pointed out that such approaches may be contributing to building silos that help in maintaining the segregation within campuses, rather than breaking it down by blaming the students for shortcomings of their institutions.

3.3. Symbolic Landscapes: Murals, Monuments, and Naming

The symbolic landscape of the university, made up of whom it honors, whom it represents through imagery, and whom it chooses to remember or forget through history, serves as an ever-present environmental statement that identifies what the institution was built for and whose significance the institution holds as key. For many disadvantaged students, being confronted by this landscape on a daily basis makes evident the fact that they are outsiders in this environment.

Also, unlike the past, such institutions have resorted to using public art through culturally enriched murals in a bid to reshape the environment around them. An example of such a project is The Place of Belonging Mural Series, which has been initiated by Sacramento State University. This is a continuous project whose latest mural was unveiled in September and will be in use during the year 2025. The objective of this particular project is to collaborate with all the university students, faculty members, alumni, staff, and even community stakeholders in producing murals that will reflect the culture of the marginalized individuals. As a result, the feeling of belonging will be experienced both during and after the process (Sacramento State, 2025). According to literature on the effects of cultural positivity on college experiences, the strategy is likely to prove successful since studies have shown that positive portrayal of culture does influence the sense of belongingness of people of color in the college setting (Museus, 2014).

The topic of statues and renaming has risen to prominence in discussions on the campuses of universities both in America and in Europe following the increased anti-racist movements since approximately 2015. Although the discussion around renaming can be considered political in nature, it has to do fundamentally with questions of belonging: whom does the university celebrate and whose contribution to the history of the university is considered worth commemorating? For students who have to pass under the statues of those who were responsible for colonization and segregation to attend classes, there is clearly a problem of belonging.

3.4. Informal Spaces: Student Centers, Lounges, and Cultural Houses

Apart from classrooms and residences, informal spaces make up a huge part of students' experiences within a university environment. It is true that all students do not have access to comfortable and adequately resource-filled spaces for meeting friends, studying together, dining, relaxing, and unwinding. According to existing research, students who belong to marginalized communities tend to utilize informal spaces on campuses less often than other students, due to the fact that such spaces have been created based on the assumption that there is a 'default' student for all purposes (Garvey et al., 2015).

"Ethnic resource centers and cultural houses" are examples of spaces that respond to this phenomenon. Spaces set aside for particular communities such as Black student unions, Latino cultural centers, Native American resource centers, and LGBTQ resource centers fulfill more than just programming roles; they act as physical spaces that embody community and act as an escape from a place where oppressed students are expected to work towards visibility. According to the literature on this topic, the physicality of the space is very important. A center that is well situated, visibly located, sufficiently funded, and aesthetically conscious makes a very different statement to one that operates out of basements at odd hours of the day.

The post-pandemic era has imposed extra demands upon what needs to be provided by informal spaces at universities. The shock experienced in 2020 and 2021 showed how dependent students, particularly those from deprived backgrounds, were on informal spaces not just as venues where they could socialize but also to fulfill their basic needs of having a stable Internet connection, studying without disturbance, eating regularly, and staying mentally well. Inequality is generated due to space design based solely on the preferences of middle-class, comfortable students.

3.5. Gender-Inclusive Facilities and the Spatial Politics of Identity

Of all the spatial problems confronting modern institutions of higher learning, none has received as much attention as gender-neutral bathrooms and changing areas. There is no room for compromise on this issue: according to the results of the 2022 US Transgender Survey Report, approximately 46 percent of transgender and gender non-conforming participants avoided using public restrooms for reasons of fear and lack of comfort, which speaks volumes about any academic setting where there are no gender-neutral spaces available (Shepley Bulfinch, 2025). If a student needs to plan a day schedule based on safe restroom access, something is clearly wrong with the spatial arrangement.

More than 150 higher education institutions in the United States have implemented gender-neutral restrooms, with many others undergoing a similar transition or planning to construct them (EAB, 2024). Experience from institutions that implemented gender-neutral facilities early provides useful lessons: the key to a successful renovation lies in the fact that the facilities must be strategically placed throughout the university grounds and not be concentrated in a single area, as evidenced by UCLA's initiative to make sure no gender-neutral restroom facility is beyond two minutes' walking distance from any point on campus (EAB, 2024). In 2022-2023, MIT's Institute Community and Equity Office conducted an extensive review of all restrooms across MIT's Cambridge campus.

The University of California system updated its guidelines for gender-inclusive facilities in 2024 to comply with California's updated building standards, mandating that new construction and major renovations include all-gender

facilities as a baseline (UCOP, 2024). This legislative embedding of inclusive design is significant: it removes the question from the discretionary realm of institutional goodwill and treats it as a baseline requirement of infrastructure.

Design considerations for inclusive restrooms show a broader logic that applies to the design of all inclusive spaces. The architects and firms operating within this area have noted that issues like safety, privacy, and accessibility need to be considered right from the inception of any design project. As expressed by one design firm, the architect has both the privilege and obligation of designing spaces that provide not only physical safety but also mental and emotional safety for the individuals within them, giving them opportunities to thrive and learn (Shepley Bulfinch, 2025). The lesson here is that inclusion can be seen as an architectural accomplishment.

4. Who Designs, and for Whom: The Problem of Default Users

One of the key concerns raised in studies regarding inclusive campus design is that of the default user, which is to say, the underlying assumption about what type of student the space has been created for. At most Western research institutions, the default student is envisioned as being white, male, able-bodied, cisgender, Christian, and coming from a middle class background where he was exposed to high-end learning environments before attending the university. Spaces created with such a default student in mind will inherently result in friction for anyone else.

This issue is replicated in part by the way design teams are assembled. When the individuals who make the decisions concerning campus space are not themselves from marginalized groups or fail to include marginalized groups in their decision making process, then the space itself will be the product of an unbalanced decision-making group. NCARB revealed its findings in 2024 regarding improvements in gender equality and racial diversity within the new group of licensed architects in the United States, yet the profession continues to be predominantly white and male compared to the general population; even more unbalanced when comparing senior positions (ArchDaily, 2024).

Processes of participatory design, which prioritize the voices of marginalized community members in space planning and evaluation, are not only a necessary methodological fix but also an ethical duty. In research conducted by the Society for College and University Planning, it was established that student-based knowledge regarding the creation of formal learning spaces as well as informal study and social areas may enable universities to promote better integration among marginalized students and enhance their academic performance (SCUP, 2024). The issue is that participatory approaches entail an institutional readiness for power sharing rather than engagement in consultation theatrics, or the act of collecting student feedback without taking it into account.

5. Intersectionality and the Limits of Single-Axis Design Thinking

Most of the current scholarship on the topics of campus design and belonging has revolved around one single identity category: spaces for students of color, LGBTQ spaces, disability spaces. This kind of framing has its utility but at the same time, it misses the reality that many students are marginalized not only by one identity but multiple identity categories at once. Queer people of color are not only marginalized by spaces allocated for their race but at the same time by those reserved for their sexuality/gender.

Intersectionality, a concept proposed by Kimberlé Crenshaw (1989) within the scope of law and Black feminism, is particularly relevant to design thinking in space. For instance, the student who just happens to be black, first-generation, Muslim, female, and disabled, does not reside in the space as an accumulation of four identity-spaces. Rather, she occupies one space in which all these identities interact or conflict together. Design that is insensitive to intersectionality will create spaces that accommodate particular marginalized students while neglecting other marginalized ones.

Recent research on queer students of color at predominantly white institutions has documented precisely this dynamic, finding that students who held multiple minoritized identities often experienced institutional erasure in both predominantly white LGBTQ+ spaces and in racial-ethnic student organizations that were not fully affirming of queer identity (CMU LibGuides, 2024). A spatially responsive institution would design resource centers, gathering spaces, and programming environments with this intersectional reality in mind, rather than assuming that the existence of a queer resource center and a Black student union separately solves the problem.

6. Evolving Practice and the Horizon of Possibility

6.1. Universal Design and Its Expansion

UDL, first conceived as a methodology for curriculum development, has now begun to be implemented in the design of physical spaces as well. The basic idea is that designs created with the limitations of the least advantaged group in mind will automatically suit everybody else better. For instance, curb cuts made in sidewalks so that they may be accessed by those confined to wheelchairs can similarly benefit those on bikes as well as mothers pushing prams. Similarly, captions in educational videos designed with deaf students in mind have proved helpful for those students who cannot understand the lecture language.

Universal Design, a concept being expanded upon in modern applications, considers both the social and cultural elements of inclusion, not just physical access. In the Gensler Research Institute's study on Learning Landscapes released in 2024, the requirement for a university environment that is adaptive, inclusive, and socially aware, able to facilitate different ways of learning, was emphasized (Gensler Research Institute, 2024). This involved the incorporation of culturally-based knowledge systems, alternative gathering spaces, and intergenerational and cross-cultural exchange environments.

6.2. Assessment and Accountability in Campus Design

Among the consistent shortcomings in inclusive design on campuses is a lack of effective means of assessing how well design interventions deliver on their objective of promoting belonging. Colleges invest heavily in designing new spaces or transforming existing facilities to become more belonging-friendly, but they fail to carry out an assessment process afterwards to determine if members of the targeted population indeed experience greater sense of belonging. SCUP (Society for College and University Planning) has recently put together a playbook on how to use diversity equity inclusion (DEI) metrics when designing college campuses (SCUP, 2024).

Climate surveys are another approach that can be used for such assessments. Universities such as the University of North Carolina at Chapel Hill have included questions related to belonging within their campus climate surveys and separated the responses according to the demographic characteristics of students, thus enabling planners to locate spatial correlates of belonging deficiencies (CBE Life Sciences Education, 2024). However, the fact is that climate surveys tend to measure perceptions about the entire surrounding environment and not any particular design aspect, which makes it hard to establish a direct connection between an outcome and its design intervention.

6.3. Technology, Hybrid Space, and New Belonging Challenges

The advent of hybrid learning models as a result of the Coronavirus pandemic has raised new issues regarding the connection between physical space and the sense of belongingness on campus. This is because while for students enrolled on campus, the physical space of the institution remains the dominant environment, for many more students, the physical campus serves merely as a destination and not an environment where they need to spend their time regularly.

These digital and hybrid spaces, too, bring design and belonging issues of their own. As research demonstrates, students from disadvantaged backgrounds suffered more from the disruptions to campus space caused by the pandemic than other students did. In fact, students from disadvantaged backgrounds had relied more than privileged students on the resources campus afforded them because they couldn't access those same resources privately (Hope Center, 2021). Therefore, the point of equity makes the case for investment in good physical campus space all the stronger.

7. From Retrofit to Reimagination: What Genuine Spatial Justice Requires

Inclusive design on campus has primarily been dealt with through the means of retrofitting: adding a cultural center here, renovating restrooms there, and hiring artists to paint murals after students protest for change. While these solutions do provide some benefit, the underlying assumption is that the campus is more or less an acceptable place that simply needs to have some things added to make it better.

Indeed, an approach to campus spaces through spatial justice, informed by theories from scholars such as Edward Soja (2010), along with other scholars specializing in higher education contexts, including Samuel Museus and Michelle Samura, would call for much more. Specifically, a critical analysis is required, which questions not only the production of the original campus spaces but also their purpose, as well as the way in which these original purposes affect the

current spatial environment and sense of belongingness. It should be noted that this process does not necessarily involve demolition or any change to the built environment on the campus.

Practically speaking, this requires transitioning from a system whereby diversity offices make modest requests for accommodations to the design departments to a situation where belonging, as a feature of design that is structural in nature, is incorporated into campus master planning, renovation requirements, and architectural considerations. This necessitates the inclusion of those who will be affected by design choices in the decision-making process in an actual, rather than superficial, way. Finally, it involves adopting post-occupancy assessment as a standard procedure. In the words of Strayhorn (2019) and many others, this is a process by which belonging is acknowledged to not be something extra, or even optional, but rather an essential part of what institutions are meant to provide to students.

8. Conclusion

Campuses are not merely sites at which higher education takes place; campuses play a role in the production of higher education itself. The site in which students reside contributes to the formation of identity, relationships, opportunities, and even whether or not their presence is seen as enhancing the institution or whether it should be managed. For students who are from marginalized communities, they will always encounter the kind of small but significant friction, creating deficiencies in the realm of belongingness.

This ever-growing body of research can be read as not only a criticism but also a path to be taken. Scholarly works have proven that design elements ranging from classroom configuration to restrooms, from murals to the investment in a cultural center, from naming buildings to the sensory aspects of an institution, impact how marginal groups view their inclusion into the university community. The question becomes, then, whether institutions are prepared to consider such conclusions as relevant design principles.

Belonging as infrastructure can serve as both a challenge and a resource for our purposes. Infrastructure is the basic structures that a society or organization deems worth investing in because they are deemed fundamental. Roads and power lines are not reconsidered each year based on fiscal or political concerns; instead, they are considered the given context within which all other operations take place. If belonging is similarly taken to be the given condition under which educational opportunities become possible, the physical infrastructure that produces such belonging will be mandatory.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no known financial interests, personal relationships, or competing interests that could have appeared to influence the work reported in this manuscript, *Belonging as Infrastructure: How Campus Environment Design Shapes Sense of Belonging Among Marginalized Students*. The research was conducted independently, and the authors have no conflicts of interest to disclose.

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