

THINKING INSIDE THE BOX: ALTERNATIVE INFILL STUDENTS HOUSING ON UNIVERSITIES' CAMPUSES

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ABSTRACT

This research investigates housing insecurity and homelessness challenges among graduate and professional students at the largest university in the United States. It is anticipated that similar challenges exist in most universities both in the US and beyond. Literature suggests that there is little data on housing issues and challenges of university students who pursue graduate and professional degrees. This research also attempts to introduce a parasite case-study solution designed for a selected campus building and documents students' response to the proposed architectural solution for their housing issues. The presented work utilized a two-stage research methodology. First, an architectural proposal for small, medium, and large infill housing was designed based on a parasite housing model on the university main campus. The micro housing units were designed for an early 1970 pre-cast concrete building to serve as a case to measure students' perception. Second, an online questionnaire was built and deployed in which the survey was administered in the Fall of 2021 and during COVID-19 pandemic, through a university-wide distribution list. Approximately 1,500 respondents completed the survey, which accounts for a response rate of 11%. Findings from the data analyzed indicated that 35% of the respondents have

experienced housing insecurity whereas 13% of the respondents have experienced homelessness. 44% of the respondents have expressed willingness to live in the proposed infill housing solutions. This study also highlights housing issues among graduate students of diverse nationality, race, and gender. The survey also measures their perception towards the proposed infill housing solution for a given campus building. This work seeks to understand the housing challenges faced by graduate students, who are a relatively under researched demographic, and offer an innovative architectural solution to their problem.

KEYWORDS

Campus infill housing; micro-housing design; graduate student housing; housing insecurity; college student homelessness

1. INTRODUCTION

Housing security is well-known as one of the basic needs for college students and it is linked to the ability to complete their education (Broton, 2017). The existing body of published research predominantly focuses on housing insecurity of undergraduate students pursuing

a 2 or 4-year college education (Crutchfield & Maguire, 2017; Goldrick-Rab et al., 2020; Hallett & Crutchfield, 2018; Ringer, 2015). However, there is a noticeable gap in research regarding the housing insecurity of graduate students pursuing a masters, professional, or doctoral level degrees. Limited information is available regarding the specific challenges faced by graduate students in terms of housing insecurity and homelessness. Furthermore, there is a lack of understanding regarding the potential role of architectural design in addressing these housing issues. Little research has been conducted to explore whether innovative architectural solutions, such as on-campus in-fill housing, can effectively address the housing needs of graduate students. Therefore, the purpose of this work is to assess the housing issues of a university's graduate students, namely housing insecurity, and homelessness, and explore their perceptions and attitudes towards an innovative on-campus in-fill housing concept. By shedding light on the unique housing challenges faced by graduate students and investigating the potential of architectural interventions, this study aims to contribute to the broader understanding of housing insecurity and homelessness among college students while exploring viable solutions to address their specific needs.

The questions for this article are- What is the situation of housing issues among the graduate and professional students at a large public university? How does it compare to other universities in the United States? What are the graduate students' perceptions towards the proposed in-fill housing? This study aims to contribute to the broader understanding of housing insecurity and homelessness among graduate level college students, who have received limited attention in previous research. By delving into their housing challenges, insights can be generated that can inform policies and interventions tailored to the unique needs of graduate students. Moreover, by examining the perceptions and

attitudes of graduate students towards the innovative housing concept, the research can provide valuable insights into its feasibility, acceptability, and potential benefits. This work intends to benefit university administrators who struggle to address the issues of housing for their graduate students' population using a typical housing approach. Architects who are involved in university housing projects and need a better understanding of the housing issue will also benefit from this work. Lastly, this study can provide valuable insights and benefits to researchers focusing on college students' housing insecurity and homelessness.

2. LITERATURE REVIEW

Housing insecurity is among the primary concerns of universities' leadership today unlike two decades ago (The Hope Center, 2021). As per a survey conducted by the American Association of Collegiate Registrars and Admissions Officers (2020), 86% of respondent institutions believe that housing and food insecurity adversely affect the students' ability to pursue their degrees. This includes dropouts, lower grades, and slower degree completion. Most of these institutions have conducted internally administered surveys to understand these issues among their students in order to address them. According to a report from Schoolhouse Washington (2018), students affected by homelessness show worse academic performance than their housed peers. The graduation rates were observed to be lower than even the low-income students who were never homeless. The students who never experienced homelessness (housed students) showed 81% graduation rate, the low-income housed students showed 72% graduation rate, and the homelessness experienced (homeless) students showed only 56% graduation rate. In attendance rates, all the housed students showed the highest

rate at 86%, followed by the low income housed students at 81%, and followed by the homeless students who showed as low as 62%. The homeless students also exhibited the highest rate of suspension among these three categories at 10%. The report also highlighted that the student homelessness rate has more than doubled in a decade.

One of the goals of this survey research was to assess the housing issues faced by graduate students through measuring housing insecurity and homelessness experienced by them. The definition of housing insecurity “includes a broader set of challenges such as the inability to pay rent or utilities or the need to move frequently” (Goldrick-Rab, 2017). The United States Department of Housing and Urban Development (2024) defines homelessness in four categories namely literally homeless, imminent risk of homelessness, homeless under other Federal statutes; and fleeing/ attempting to flee domestic violence. The first category “literally homeless” refers to “Individual or family who lacks a fixed, regular, and adequate nighttime residence” which mean “has a primary nighttime residence that is a public or private place not meant for human habitation” or “is living in a publicly or privately operated shelter designated to provide temporary living arrangements (including congregate shelters, transitional housing, and hotels and motels paid for by charitable organizations or by federal, state and local government programs).” Several studies have been published that describe the housing issues faced by undergraduate students in the United States. Among them is the annual survey of college students conducted by the Hope Center in which thousands of students participate in a national survey across the country. The findings in the surveys conducted between 2015 to 2020 indicate that housing insecurity were up from 46% to 60% and homelessness levels were up from 10% to 20% among the undergraduate students (Goldrick-Rab et al., 2020).

North Carolina (NC) State University led an initiative to address its student housing issues (NC State University, 2019). The formation of the Food and Housing Security Initiative at NC State in 2017 demonstrates a proactive approach to addressing food and housing insecurity among students. The involvement of faculty, staff, and students highlights the collaborative effort to tackle the issue on campus. A campus-wide student survey found almost 10% of respondents had experienced homelessness in 2016. The Affordable + Supportive Student Housing for NC State Project is a direct outcome of the Food and Housing Security Initiative’s findings and recommendations. As part of the project, eleven students “conducted research on innovative university and multifamily housing, and designed demonstration projects for two university-owned campus sites, which included a range of unit types, community spaces, and supportive services”. Their research focused on exploring innovative models of university and multifamily housing to meet the specific needs of students facing housing insecurity. Based on their research, the students designed the demonstration projects.

The housing options developed by the students were dormitories, micro-housing, and a variety of apartments with one or more bedrooms for the diverse needs and preferences of the students. In addition to offering a variety of housing options, the Affordable + Supportive Student Housing for NC State Project also emphasizes the importance of creating social spaces, shared kitchens, common courtyards, and town-gown interfaces through retail and public spaces. This approach proposes a variety of new housing for its students in existing university land. However, it lacks information regarding the affordability of such housing for the students. On-campus dormitories in this university (like many others) have a higher rental cost compared to off-campus apartments. For North Carolina state, the rental cost of a double occupancy dormitory

room was \$3,400 for a semester (NC State University, 2019) whereas the rental cost of a room in an off campus shared housing apartment was \$2,500 for a semester (NC State University, 2022). Therefore, these solutions may not effectively address the housing issue if it does not prioritize affordability for students.

3. METHODOLOGY

This research utilized a two-stage methodology. First an architectural solution for small, medium, and large housing was designed and modeled based on a parasite concept on a university campus building. Second, an online survey research was designed and deployed in the Fall of 2021 through a university-wide distribution method.

The first stage of this research involved identifying a host building on a university campus where 3 scales of in-fill architectural solution housings were designed namely small, medium, and large. The second stage of this research involved survey research that was conducted in 2021 during COVID-19 pandemic. The goal was to understand the housing issues and preferences of the graduate students at one of the largest public universities in the United States. The on-campus infill housing typology was presented to the survey participants to assess if an in-fill architectural solution is appealing to students. The study received the Institutional Review Board exemption approval.

During the Fall of 2021, there were 67,133 students enrolled at the university in which 54,595 (83%) students were undergraduate students and 11,456 (17%) graduate students (Texas A&M University Accountability Office, 2021). The research laboratory administered the survey to the graduate students through university-wide email in the Fall of 2021. Students numbering 3,360 students started the survey, and 1,500

respondents completed the survey which amounts to a response rate of nearly 13%. The respondents were compensated with a \$5 Starbucks gift card at the end of the survey. As the survey was emailed to students it was assumed that they had the means to access it (smartphone or computer). The survey was designed to gather their perception towards a proposed housing design on campus. Graduate students in this context refer to students pursuing a master's, PhD, or a professional degree or a combination of these degrees. The responses were distributed as follows: 7,916 (69%) students were master's level students, 2,410 (21%) were doctoral students, and 1,130 (10%) were professional degree seekers.

In this project, an architectural solution was proposed in response to the challenges of housing insecurity and homelessness among graduate students. The survey assessed the perceptions of graduate students towards this solution. As a part of their architectural education, undergraduate students of architecture and construction science were responsible for designing these structures. The proposed housing design was tailored to the unique characteristics of the campus host building and adhered to campus design guidelines. Each housing unit was designed to complement the architectural style of the host building. The housing incorporates innovative construction systems such as cross laminated timber building systems. It serves as a temporary solution which attempts to address the students' housing problems. The Langford Architecture Building A on the Texas A&M University campus was selected as the host building for the infill housing. The Langford Architecture Building A is a pre-cast concrete brutalist structure with distinctive coffers in one of its external walls. The building was designed by HKS Dallas firm, and it was built in 1977. The proposed housing units was designed to be situated within these coffers, resembling drawers in a desk, allowing for

minimal modification to the existing building. The proposal seeks to make use of the underutilized external spaces of the host building with minimal modification. Three types of houses are proposed based on their floor area, namely small, medium and large of sizes 29, 65 and 130 square meters

respectively (figure 1a). The small house (29 square meters) is designed for a single student. The medium size house covers 65 square meters and is designed for a married student with one kid. The large size house of 130 square meters is designed for a married student with two kids.



Figure 1a. Floor plans of the proposed in-fill graduate student housing.

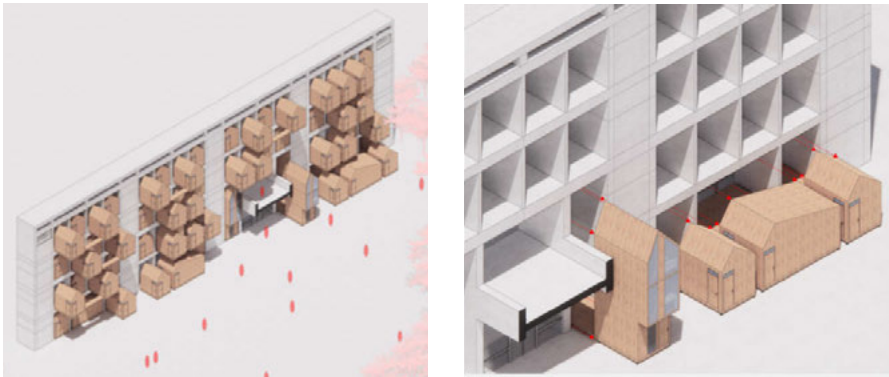


Figure 1b. The proposed in-fill graduate student housing nestled in the selected host building.

4. FINDINGS

To answer the first research question: What is the situation of housing issues among the graduate and professional students at a large public university? The results indicated that 35% of respondents have experienced housing insecurity, 13% have experienced homelessness, and nearly 44% spent way more than 30% of their household income paying for rent, making housing unaffordable per national standards (figure 2). In terms of gender, 79% and 53% of non-binary respondents have experienced housing insecurity and homelessness respectively, the highest among all gender categories. 44% of respondents

spend more than 30% of their household income on rent and utilities.

Figure 3 shows the indicators to identify housing insecurity among the graduate students. Housing insecurity is typically assessed with questions about the affordability of housing and utilities, the stability of students living situations, and crowding and doubling up. The majority (23%) of the respondents experiencing housing insecurity indicated a "rent or mortgage increase that made it difficult to pay". This was followed by "Lived with others beyond the expected capacity of the housing" at 11.1%. 10.7% of the respondents experiencing housing insecurity moved in with others due to financial difficulty.

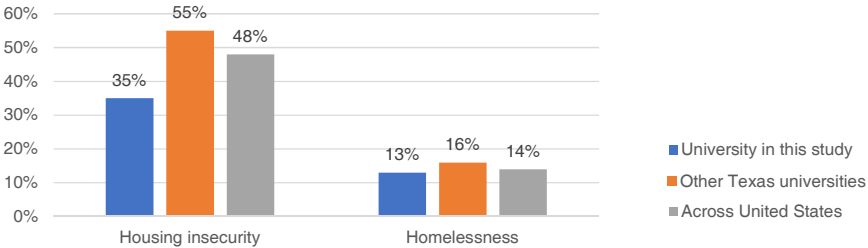


Figure 2. Comparison of housing issues of the graduate students at the selected university and of students at other universities in The United States (Hope Center, 2021).

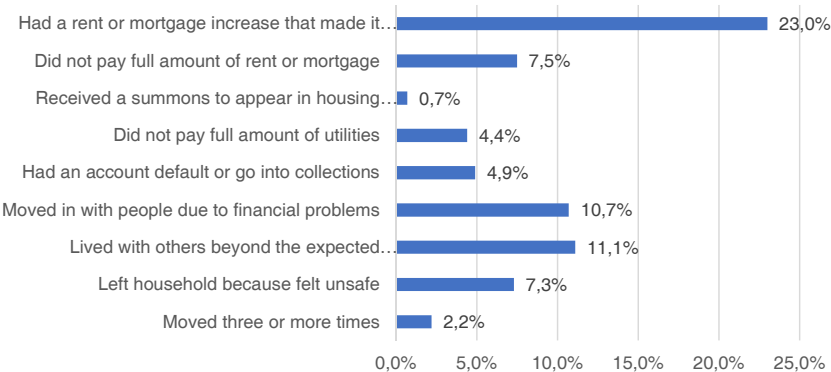


Figure 3. Housing insecurity indicators and the student response in this survey.

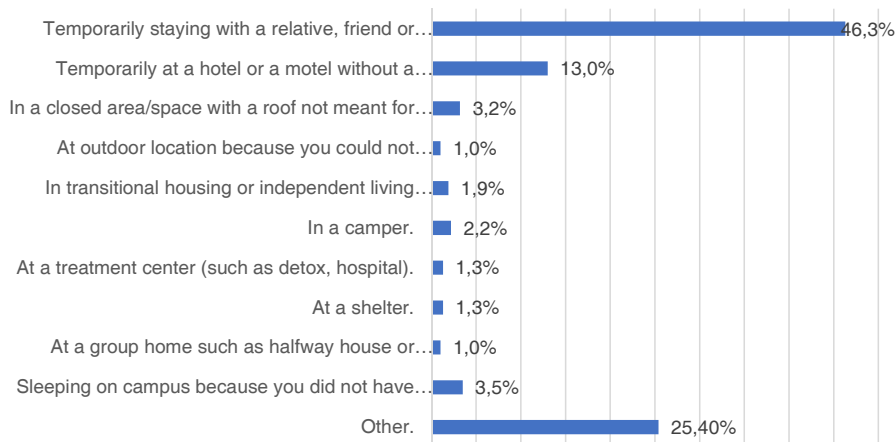


Figure 4. Homelessness indicators and the survey response by the students at the university in this study.

Homelessness focuses on sheltered or unsheltered homelessness, asking students where they sleep and whether they identify as homeless. Figure 4 shows the indicators for homelessness and the response to the indicators. 46.3% of the respondents who experienced homelessness temporarily stayed with a relative, friend or did couch surfing until they found their own place. This was the majority of the respondents who experienced homelessness followed by 13% of the respondents who stayed at a hotel or motel temporarily because they did not have a permanent house to return to. 25.4% of these respondents marked "other" where they were compelled to stay at a place other than a permanent residence.

In this survey which (included international students), 49% of the respondents identified themselves as White, followed by Asians (32%), Hispanic (12%), Black (4%), multi-racial excluding Black (2%), Native-American (1%) and multi-racial including Black (less than 1%). The data regarding the race of international students

was not available from the university online data platform and the racial groups might not be the true representations of student race.

Figure 5 shows the housing vulnerability by race in this survey. Among the respondents in this survey, 71% of Black respondents have experienced housing insecurity and 27% of them have experienced homelessness, which is the highest among all the respondents. This corresponds with the findings from the Hope Center survey where Black, indigenous and Latinx students reported higher insecurity levels than other races. 89% of native American respondents have experienced housing insecurity which is the highest among all the races in this survey. Among the Asian students, 63% reported to have experienced housing insecurity and 17% experienced homelessness. 63% of Hispanic students have experienced housing insecurity and 16% have experienced homelessness. Among the White student respondents, 62% have experienced housing insecurity and 9% have experienced homelessness.

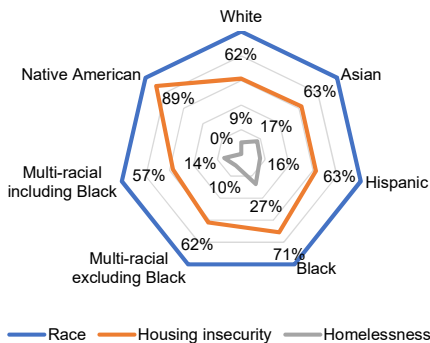


Figure 5. Housing insecurity and homelessness by race of the respondents in this survey.

Female students formed the largest category of respondents who participated in this survey. 58% of the respondents identified themselves as females, 41% as males, and 1% as non-binary. Figure 6 shows the housing issues among these genders. 79% and 53% of the non-binary gender respondents have experienced housing insecurity and homelessness respectively, the highest among all three categories. Between males and females, males have reported higher levels of homelessness compared to females (15% in contrast to 12%). Females have reported higher housing insecurity values (64% as opposed to 59%) similar to results from the Hope Center where female students reported higher basic needs insecurity levels than male students. As of 2021 school year, 54% of the graduate and professional students were males and 46% were females. The majority (61%) of the graduate student respondents lived with a roommate, a person with whom is not family or a significant other. It can be speculated that perhaps the non-binary students have difficulty in finding roommates which might be the cause of their housing issues. The Hope Center (2021) survey reported that females experienced higher levels of housing insecurity than males (67% as opposed to 59%).

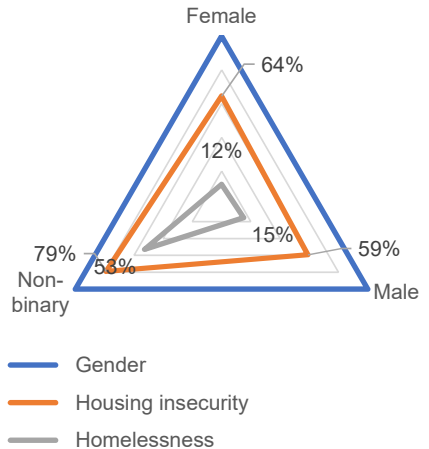


Figure 6. Housing insecurity and homelessness by gender of the respondents in this survey.

The respondents were shown a video describing the proposed in-fill housing types during the survey. They were asked to indicate their preferred housing type from the three choices. Nearly three-fourths of the respondents chose the small and medium sized house. The majority (51%) of the respondents indicated a preference for the medium size house of 65 square meters in size. This is followed by the small size house of 29 square meters in which 30% of the respondents indicated their preference. The large size house of 130 square meters was the least preferred housing type chosen by 19% of the respondents. Figure 7 shows the likelihood levels of the respondents to live in the proposed in-fill housing in exchange for work. Nearly half (44%) of the respondents indicated their willingness to live in the proposed housing. However, graduate students in other contexts such as larger cities where housing is more expensive should undertake this survey. This way, more understanding towards the graduate students' response to the in-fill housing can be measured.

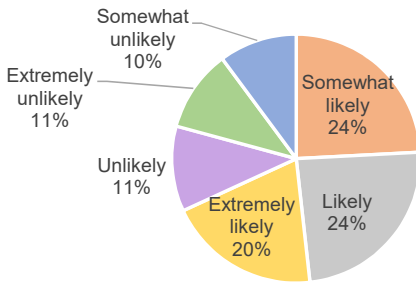


Figure 7. Respondents' indicated likelihood of living in the proposed in-fill housing in this study.

5. CONCLUSION

This survey research proposed to investigate housing insecurity and homelessness at a large public university in the United States. It proposed a case-study parasite solution designed for a particular campus building and documented student responses to this architectural solution through an online survey in the Fall of 2021 during the COVID-19 pandemic. Around 35% of survey respondents indicated to have experienced housing insecurity, 13% have experienced homelessness, and nearly 44% spent way more than 30% of their household income paying for rent, making housing unaffordable per national standards. Literature suggests 55% of the students at other universities across Texas have reportedly experienced housing insecurity and 16% have experienced homelessness. Similarly, 48% of students across the United States have reportedly experienced housing insecurity and 14% have experienced homelessness. However, these studies were conducted among undergraduate level students pursuing a 2-year or 4-year degree. So, there is a lack of data among students pursuing graduate degrees and further study is recommended to understand the cause behind their housing issues. In response to the proposed housing, nearly half

of the respondents indicated their willingness to live in the proposed infill housing. Although, nearly half of the respondents expressed a willingness to live in the proposed in-fill housing, this survey should be administered in universities in other contexts (like larger cities) to assess the response to proposed infill architectural solutions.

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