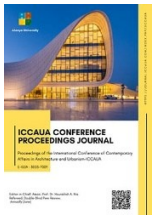

ICCAUA Proceedings Journal

Proceedings of the international conference of contemporary affairs in architecture and urbanism-ICCAUA

Volume 8 (December 2025), Pages 1719–1731

Journal homepage: https://journal.iccaua.com/

DOI: https://doi.org/10.38027/ICCAUA2025EN0544

Preferences for student rental housing in Dehradun, India: Using TOPSIS technique

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Received: 16 February 2025
Revised: 12 May 2025
Accepted: 18 June 2025
Available online: 5 July 2025

This article has been selected and peer-reviewed for publication in this journal as part of the 8th International Conference of Contemporary Affairs in Architecture and Urbanism, held on 8–9 May 2025 in Alanya, Türkiye.

A b s t r a c t

This study aims to identify and prioritise key attributes for enhancing service quality in Purpose-Built Student Accommodation (PBSA), focusing on student rental housing. Given the increasing demand for high-quality student housing, assessing infrastructure, facilities, and service quality from students' perspectives is essential. The research was conducted in Dehradun, India—a major educational hub—examining 27 housing attributes and 10 neighbourhood attributes based on both their perceived importance and satisfaction levels. A five-point Likert scale survey was administered to 425 students, selected through simple random sampling. The data were analysed using the Technique for Order of Preference by Similarity to the Ideal Solution (TOPSIS), allowing for a comparative performance analysis of each attribute. The results highlight significant gaps between the importance students assign to features like high-speed internet, safety, and food services, and their actual satisfaction with those offerings. At the neighbourhood level, safety and access to commercial amenities (e.g., photocopy and stationery shops) emerged as highly valued yet underdelivered. At the housing level, 24-hour water supply and hot water availability were prioritised but inconsistently met. By integrating a multi-criteria decision-making framework with a dual-layered evaluation of expectations versus experiences, the findings provide valuable insights for developers and higher education institutions, ensuring student housing aligns with student expectations and quality standards. By integrating a multi-criteria decision-making framework with a comparative performance evaluation, the study contributes to urban housing discourse and the socio-economic planning of inclusive student accommodation.

K e y w o r d s : Studentification, Rental housing, affordability, Quality of life

1. Introduction

In India, there is a growth in higher education institutes (HEIs) because of its sizable young population. Cities like Dehradun have emerged as educational hubs, attracting a large inflow of students annually. With this influx arises an urgent need for rental housing options tailored to students' specific needs. Purpose-Built Student Accommodation (PBSA) is increasingly being recognised as a sustainable solution to enhance students' quality of life (QoL), affordability, and satisfaction. Yet in mid-sized cities like Dehradun, the absence of a structured rental framework leaves students dependent on informal housing options. The issue is not unique to students alone; the broader rental housing sector in India also faces systemic challenges. For instance, the Economically Weaker Section (EWS) population is often constrained to live in slums and unauthorised colonies due to limited affordability and the absence of a suitable housing supply. A neighbourhood study in Delhi revealed that building characteristics, financial constraints, and social considerations strongly influence EWS rental choices, with both economic and social factors shaping housing decisions (Ekta and Vardhan, 2025). Similarly, at the policy level, research has highlighted critical success barriers (CSBs) such as inflexible rental agreements, negative social attitudes, and a lack of government incentives, which hinder the effective implementation of rental housing policies in urban India (Saha, Banerji and Kumar, 2025). These insights underscore that rental housing in India—whether for low-income groups or students—is shaped by overlapping structural, economic, and social challenges. Against this backdrop, the housing choices of students are shaped by a blend of housing-level attributes (e.g., privacy, internet access) and neighbourhood-level attributes (e.g., safety, access to amenities).

Theoretically, this study focuses on two frameworks: studentification, which refers to the transformation of neighbourhoods due to increased student populations (Smith, 2005) and spatial justice, which emphasises equitable access to urban services and housing (Khosroshahi, 2015). Following Fainstein's call to move beyond economic reductionism, this research demonstrates how housing provision for students must address not only affordability but also core issues of safety, privacy, and access to services. In doing so, it responds to the evolving concerns in

planning theory about equity, inclusiveness, and the lived experience of urban space. Together, these frameworks illuminate how urban transformations disproportionately impact student renters, particularly in cities undergoing rapid educational and infrastructural growth.

Previous research has primarily focused on metropolitan or Western contexts, often neglecting the layered experiences of students in secondary Indian cities. These students face challenges shaped by affordability, safety, digital infrastructure, and neighbourhood services. Moreover, few studies systematically rank the importance of these housing and neighbourhood attributes or compare them with satisfaction levels to reveal service delivery gaps.

In the field of multi-criteria decision making (MCDM), the TOPSIS (Technique for Order Performance by Similarity to Ideal Solution) method, developed by Hwang and Yoon in 1981, is the second most popular and well-regarded method. Saaty's Analytic Hierarchy Process (AHP) from 1980 is not far behind TOPSIS, which has gained considerable reputation and is used in a number of applications (Zyoud and Fuchs-Hanusch, 2017). The study emphasises the key factors influencing students' housing decisions at both neighbourhood and housing levels. Such research is essential for effective planning and development of student housing. Given the study's focus on student housing, students were selected as the primary respondents for data collection. The data was collected from or near the universities, colleges, and coaching centres of Dehradun city. The data collected was then filtered and screened, and the eligible responses were then analysed using importance satisfaction analysis at the Neighbourhood and housing level. The details of the methodology are further elaborated in the subsequent section.

Despite the growing student population in Dehradun, housing choices remain largely dictated by market availability rather than student needs. While earlier studies have explored on-campus housing or general affordability issues, few have holistically assessed students' preferences using an integrated, data-driven approach such as the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). This research addresses the gap by comparing both **importance and satisfaction levels** of student-preferred housing attributes, offering evidence-based insights for developers and urban planners.

This study aims to prioritise housing and neighbourhood attributes based on students' perceptions using TOPSIS. The core objectives are to identify key attributes influencing student rental housing preferences and to propose evidence-based suggestions for PBSA development in Dehradun. The study hypothesises that there is a significant mismatch between the importance assigned by students to housing/neighbourhood attributes and their satisfaction levels with existing conditions. While student housing has gained growing attention in urban planning and housing studies, much of the existing literature is focused on Western or Tier-1 Indian cities, leaving a gap in understanding the experiences of students in secondary urban centres such as Dehradun. These cities often lack structured Purpose-Built Student Accommodation (PBSA), resulting in students relying heavily on informal rental housing. Existing studies rarely apply a multi-criteria evaluation to understand how students prioritise housing and neighbourhood attributes, nor do they often compare these priorities with actual satisfaction levels to assess service delivery gaps.

This study addresses this research gap by using the TOPSIS (Technique for Order Preference by Similarity to the Ideal Solution) method to evaluate both the importance and satisfaction of student housing attributes in Dehradun. The intent is to provide an evidence-based prioritisation framework that can guide more responsive PBSA development, especially in under-researched urban contexts.

Based on these objectives, the study tests the following hypotheses:

- **H1**: Students prioritise basic utilities and safety-related housing features over recreational or social amenities.
- **H2**: There exists a statistically significant gap between the importance students assign to key housing attributes and their actual satisfaction with those attributes.

This research contributes to urban housing literature by integrating theoretical and empirical perspectives and offering a replicable model for student housing analysis in emerging educational centres. The findings are valuable for housing developers, higher education institutions (HEIs), and urban planners for designing student-centric housing.

The paper is structured as follows: Section 2 outlines the literature review, followed by Section 3 elaborating upon the material and method, Section 4 highlights the Data Analysis, further laying out results in Section 5, Section 6 discusses key insights and implications, and Section 7 concludes with recommendations.

1. Literature Review

Urban development and demographic shifts have significantly altered the character of neighbourhoods in educational cities, giving rise to phenomena like studentification and gentrification. Neighbourhood transformation, as discussed by (Delmelle, 2022), covers a spectrum of changes in socio-economic and spatial dimensions, encompassing safety, affordability, infrastructure, and service quality. In cities experiencing rapid enrolment growth in HEI's, these changes often coincide with a rise in student population density. Studentification, a subset of gentrification, leads to the transformation of housing landscapes and community interactions. While students may revitalise an area through economic stimulation and rental demand, they also introduce pressures such as increased rents, displacement of long-term residents, and overburdened infrastructure (Mallach, 2016; Firth et al., 2021).

The influx of students is typically associated with an increased demand for rental housing near academic institutions. Such demand results in rapid changes in local economies and land use, often driving up property values and shifting the socio-economic profile of neighbourhoods (Bhavsar, Kumar and Richman, 2020). Recent studies (e.g., (Shi, 2021; Cenere et al., 2023)) conceptualise studentification as not only a demographic trend but also a key urban restructuring process that affects spatial justice, urban inequality, and the commodification of housing. Fainstein,

(2010) theory of spatial justice offers a valuable lens to understand how student housing intersects with broader debates on urban equity. In this context, the rise of informal rental markets, the uneven distribution of services, and the marginalisation of student tenants point to systemic spatial disadvantages that urban policy must address. Arreortua (2016) and Schnake-Mahl et al. (2020) emphasise that investment-driven gentrification, while improving urban aesthetics and livability, can also deepen housing inequalities. Moreover, the commercialisation of housing stock and short-term rentals through platforms like Airbnb has exacerbated affordability issues in many urban regions (Rabiei-dastjerdi, Mcardle and Hynes, 2022). The dataset provides evidence on how student-related neighbourhood change can be measured across Canadian metropolitan areas (Firth et al., 2021), offering valuable tools for similar research in Indian cities.

Student housing preferences are shaped by a complex interplay of economic, social, and physical factors. Traditionally, housing options are bifurcated into on-campus and off-campus categories. On-campus accommodations are often subsidised and regulated by HEIs, while off-campus housing depends on private rental markets. In India, the lack of adequate on-campus housing forces students to seek private accommodations, often under informal rental arrangements.

(Garmendia, Coronado and Ureña, 2012) highlighted that students prefer neighbourhoods rich in amenities, not necessarily in proximity to academic institutions. Cost and access to basic services frequently dictate students' decisions, even if it means residing in peripheral or less secure areas. Allinson, (2006) and (Joanna, 2010) further assert that affordability remains central, but so do other factors such as social inclusion, peer proximity, and access to public transport.

Despite these insights, studies often fail to provide a structured ranking of attributes based on actual student preferences. A few empirical investigations in Malaysia have demonstrated how students prioritise different aspects of housing quality. For instance, (Najib, Yusof and Tabassi, 2015) and (Najib, 2011) observed that elements such as privacy, noise levels, access to internet and food services, and study environments significantly affect satisfaction in on-campus settings. However, a transferable framework that compares importance and satisfaction across attributes is still lacking. Recent work by Oleńczuk-Paszel & Sompolska-Rzechuła, (2025) attempted to bridge this gap by developing composite indices to assess housing conditions and quality of life. Their analysis emphasised non-monetary elements like ventilation, indoor temperature control, soundproofing, and security as pivotal contributors to overall housing satisfaction.

With the growing complexity of housing demands, particularly among transient populations like students, it becomes essential to deploy structured decision-support systems. MCDM tools such as TOPSIS, introduced by Hwang and Yoon (1981), offer robust mechanisms to evaluate alternatives based on a range of criteria. TOPSIS evaluates alternatives against an ideal solution by calculating the geometric distance from both positive and negative ideal scenarios. This method enables planners to balance the multiple, and sometimes conflicting, preferences of stakeholders in housing contexts (Lou, Gao and Cui, 2015).

The application of TOPSIS in housing studies has gained traction due to its simplicity and efficiency. It has been used to assess everything from the sustainability of housing designs to tenant preferences and location-based evaluations. A study by (Zyoud and Fuchs-Hanusch, 2017) shows that hybrid models combining TOPSIS with entropy and AHP can produce more granular insights, particularly when dealing with subjective data. This flexibility makes TOPSIS suitable for urban housing contexts, especially in developing countries where quantitative data may be limited, but stakeholder perception is rich. Similar to the methodological approach adopted, TOPSIS has been applied in urban renewal evaluations in China to systematically rank housing and infrastructure priorities (Qiao et al., 2025).

(Oleńczuk-Paszel and Sompolska-Rzechuła, 2025) employed TOPSIS in conjunction with Importance-Satisfaction Analysis (ISA) to produce dual-layered prioritizations of housing attributes. Their findings reveal significant disparities between what tenants find important and what they find satisfactory—an insight particularly relevant to student populations, who are highly sensitive to issues like affordability, internet connectivity, and communal space quality. When applied to Indian cities like Dehradun, this methodology can not only reveal what students value most in their housing but also uncover how urban policy and informal markets fall short in delivering those needs.

In summary, while earlier research has mapped the elements influencing student housing satisfaction, few studies have embedded these within an urban transformation framework. This study addresses that gap by drawing on socio-spatial theories of studentification and spatial justice and operationalising them through a comparative MCDM model. The integration of these perspectives provides a more holistic understanding of how student housing preferences reflect and reinforce broader urban dynamics, making a significant contribution to both housing and urban planning discourse.

2. Materials and Methods

3.1 Study Design

The study adopts a mixed-methods, multi-stage approach. A preliminary scale was developed from the literature and refined through focus group discussions. A pilot survey tested item clarity, followed by a main study involving 425 students from various institutions across Dehradun. Participants included 425 students aged 15–25 years, from undergraduate and postgraduate levels. Most lived in rental accommodations, hostels, PGs, or shared flats within 500 m to 2 km of their educational institutions.

A structured pen-paper-based questionnaire using a 5-point Likert scale was designed. It covered 37 attributes (10 neighbourhood-level and 27 housing-level) identified through a literature review and validated via Cronbach's Alpha reliability testing.

Thirty-seven attributes were selected to be studied for this research. A thorough assessment of the most recent research was conducted. These characteristics were included through a pen and paper-based survey created specifically to gauge students' perception of their importance and satisfaction. A five-point Likert scale was used in the questionnaire to record replies from the participants. In this section, the detail of the process is discussed:

Table 1: Descriptive Analysis

Socioeconomic attribute	Classification	% of Respondent (Total 422)
Gender	Male	(228) 54%
	Female	(194) 46%
Age	15 - 18	(154) 36%
	19 -21	(220) 52%
	Above 21	(48) 11%
Educational Level	Undergraduate	(363) 86%
	Postgraduate	(30) 7%
	Job aspirants	(24) 5%
	Other (Ph.D. Etc.)	(5) 1%
Distance between HEI and House	Less than 500 mt	(126) 30%
	500 mt to 1 km	(55) 13%
	1 km to 1.5 km	(22) 5%
	1.5 km to 2 km	(21) 5%
	More than 2km	(198) 47%
Type of Residence	Residence	(199) 47%
	Hostel	(91) 22%
	Paying Guest (PG)	(73)17%
	Shared Flat	(59) 14%

3.2 Identification of attribute

The attributes were identified from the literature and a participatory focus group with 12 university students. In the discussion, the students were to list the attributes they considered while choosing housing and then rank them based on their preferences. The findings revealed nine broad indicators from the experiment, and 26 factors with 205 sub-variables were from the literature. For the study, the common and distinct attributes derived from both experiments, and the literature were compiled. These attributes were divided into two categories: one at the neighbourhood level with 10 variables and another at the housing level with 27 variables. The neighbourhood attributes included safety, environment, affordability, social aspects like having friends in the same location, connectivity with public transportation (bus/train), and the availability of institutes and commercial establishments like stationary shops, vegetable markets, cafés, and barber shops in close vicinity.

3.2.1 Attributes for Neighbourhood

Table 2: Neighbourhood level attributes

Code	Attribute	Definition
N_Safe	Safe locality	It means safety and security in the locality
N_Env	Trees, Greenery & Good Parks	It means greenery in the locality
N_Afford	Affordable locality	It refers to budget friendly stay in the locality
N_Social	Friends in same locality	It refers to having friends in the same locality
N_Transport	Bus /Auto stand	It refers to availability of public transport within walkable distance
N_HEI	College/Institute/coaching	It refers to availability of institute within walkable distance
N_Commercial	photocopy, stationary, Convenience Shops	It refers to availability of academic infrastructure within walkable distance
N_Recreation	Restaurants, cafes and food outlets	It refers to availability of leisure activity within walkable distance
N_Basic_Amn_A	Vegetable / fruit Shops	It refers to availability of food within walkable distance
N_Basic_Amn_B	Barber, Tailor, Parlour, cobbler etc	It refers to availability of grooming facility within walkable distance

On the other hand, the housing level attributes encompassed the cost of the room, the choice between private or shared accommodation, availability of private or common facilities like washrooms, kitchens, balconies, mess

services, ventilation and amenities such as Wi-Fi, 24-hour water supply, hot water electricity backup, provision for AC/ Cooler and the opportunity to live with people enrolled in the same stream or with friends. Privacy-related attributes from both the landlord and a neighbour, the presence of security guards and CCTV cameras, living in a secure building, freedom in entry and exit at any time, availability of common study areas, indoor games, laundry facilities, gym, common TV room, and a designated area for guests were also considered. Additionally, recommendations from friends were also considered.

3.2.2 Attributes for Housing

Table 3: Housing level attributes

Code	Attribute	Definition
H_Cost	Cost of Room	It means the impact of the price of a room on housing choice
H_Amn_A	Single occupancy room	It refers to the preference for having a private room over a shared one in student housing
H_Amn_B	Attached washroom	It refers to a preference for an attached washroom with a room while making a housing choice
H_Amn_C	Attached balcony	It refers to a preference for an attached balcony in housing choice
H_Amn_D	Kitchen for cooking	It refers to a preference for a private room in housing choice
H_Environ	Good ventilation	It refers to a preference for a ventilated room while making a housing choice
H_Amn_E	Hi-speed Wi-Fi/LAN	It refers to the preference for the availability of internet facilities while making a housing choice
H_PI_A	24 hr Water supply	It refers to a preference for an uninterrupted water supply while making a housing choice
H_PI_B	Hot water availability	It refers to a preference for the availability of a geyser while making a housing choice
H_PI_C	24hrs Electricity with backup	It refers to a preference for uninterrupted electricity while making a housing choice
H_Environ_INDOOR	AC (Air Conditioner) / Cooler	It refers to a preference for AC rooms while making a housing choice
H_Food	Food facility/ mess food availability	It refers to the availability of mess services while making a housing choice
H_Social_A	Living with friends	It refers to a preference for friends living alongside when making a housing choice
H_Social_B	Living with the same stream of people	It refers to the preference for students studying together, living alongside, while making housing choices
H_Privacy_A	Privacy from Landlord	It refers to the preference for privacy from landlords while making a housing choice
H_Privacy_B	Privacy from Neighbours	It refers to the preference for privacy from neighbours while making housing choices
H_Safety_A	Presence of a security guard	It refers to the preference for safety and security facilities, such as a guard, while choosing housing
H_Safety_B	Presence of CCTV	It refers to the preference for safety and security facilities like CCTV while choosing a housing
H_Safety_C	Secured building	It refers to the preference for safety and security facilities while choosing a housing
H_Freedom_A	NO restriction on IN-OUT timing	It refers to the preference for freedom with no time restriction while choosing a housing option
H_Freedom_B	Common Study Area	It refers to the preference for a facility like a dedicated study area while choosing housing
H_Amn_F	Indoor games room	It refers to the preference for a facility, like a dedicated indoor recreational room, while choosing housing

H_Amn_G	Laundry Room	It refers to the preference for facilities like laundry while choosing a housing option
H_Amn_H	Gym facility	It refers to the preference for a facility, like a gym, while choosing housing
H_Amn_I	Common TV room	It refers to the preference for recreational facilities like a TV room while choosing a housing
H_Amn_J	Common area for Guests	It refers to the preference for a facility, like a guest visiting room, while choosing a housing
H_Social_K	Recommendation by a friend/known person	It refers to a preference referral from a friend or any known person while choosing a housing

3. Selection of Scale

A five-point Likert scale was selected for the collection of data, which was marked from negative to positive, where one was the least important/satisfied and 5 was the most important/satisfied. Data Filtering and checking for reliability of data through the Cronbach alpha test: The use of Cronbach's alpha in this study provides evidence of the validity and reliability of the scale used to measure Student housing choice. This helps to ensure that the results obtained from the study are accurate and can be used to inform decision-making and policy development related to rental housing for students in an Indian context. Cronbach's alpha is a measure of the internal consistency of a scale or questionnaire. The value of Cronbach's alpha ranges from 0 to 1, where a higher value indicates greater internal consistency or reliability of the scale. Generally, a Cronbach's alpha value of 0.5 or higher is considered acceptable for a scale to be reliable

4. Data Analysis and Prioritisation with TOPSIS

The data were analysed using the TOPSIS method to rank attributes based on relative closeness to ideal solutions. Importance and satisfaction scores were processed separately. Cronbach's alpha was used to test internal consistency, ensuring reliability above 0.7.

. This provides a thorough method to assess and rank numerous options based on a variety of factors (Lou, Gao and Cui, 2015).

Steps followed for TOPSIS are as follows:

Step 1: Define the Decision Matrix

Identify the alternatives (options) to be evaluated. Determine the factors that will be used to assess these alternatives. A decision matrix is created, where each row represents an alternative, and each column represents a criterion. Populate the matrix with relevant data for each alternative-criterion combination.

$$\left(a_{ij}\right)_{M\times N} \qquad \text{……(1)}$$

Step 2: Normalise the Decision Matrix

Normalise the values in the decision matrix to ensure that different criteria with varying scales do not unduly influence the final rankings.

Calculate the normalised decision matrix by dividing each element in a column by the square root of the sum of squared values in that column.

$$\alpha_{ij} = \frac{a_{ij}}{\sqrt{\Sigma_{\mathrm{i}=1}^{M}\left(a_{ij}\right)^{2}}} \qquad \text{……(2)}$$

Step 3: Determine the Weighted Normalised Decision Matrix

Assign weights to each criterion based on its relative importance in the decision-making process. Multiply each element in the normalised decision matrix by the corresponding weight for its criterion.

$$x_{ij} = \alpha_{ij} * \omega_j \qquad \text{……..(3)}$$

$$\omega_j = \frac{\omega_j}{\Sigma_{j=1}^{N}\omega_j} \qquad \text{……..(4)}$$

$$\sum_{j=1}^{N}\omega_j = 1 \qquad \text{……..(5)}$$

Step 4: Identify Positive and Negative Ideal Solutions

For each criterion, identify the best (ideal positive) and worst (ideal negative) values among all alternatives. The ideal positive solution represents the highest attainable value for each criterion, while the ideal negative solution represents the lowest attainable value.

$$x_j^b = \max_{\mathrm{i}=1} \chi_{ij} \qquad \text{……..(6)}$$

$$x_j^b = \min_{\mathrm{i}=1} \chi_{\mathrm{ij}} \qquad \text{……..(7)}$$

Step 5: Calculate the Distance to Ideal Solutions
Measure the Euclidean distance of each alternative from the positive and negative ideal solutions.
Calculate the distance for each alternative using the weighted normalized decision matrix.

$$d_i^b = \sqrt{\sum_{j=1}^{N} \left(x_{ij} - x_j^b\right)^2} \quad \text{……..(8)}$$

$$d_i^\omega = \sqrt{\sum_{j=1}^{N} \left(x_{ij} - x_j^\omega\right)^2} \quad \text{……..(9)}$$

Step 6: Compute the Proximity to Ideal Solution
Determine the relative closeness of each alternative to the positive ideal solution and the negative ideal solution. Compute the proximity to the ideal solution for each alternative by dividing the distance to the negative ideal solution by the sum of distances to both the positive and negative ideal solutions.

$$s_i = \frac{\mathrm{d}_i^\omega}{d_i^\omega + d_i^b}$$

Step 7: Rank the Alternatives
Rank the alternatives based on their proximity to the ideal solution in descending order.
The alternative with the highest proximity to the ideal solution will be ranked first, while the one with the lowest proximity will be ranked last.

5. Methodological Limitations

Several limitations must be acknowledged. First, the attribute list, though comprehensive, may omit locally relevant informal preferences due to its reliance on literature and structured input. Second, self-reported Likert responses are vulnerable to social desirability and framing biases. Third, the assumption of independence among attributes in TOPSIS may oversimplify real-world interdependencies (e.g., Wi-Fi quality affecting perceived affordability). Finally, this cross-sectional study cannot account for seasonal or longitudinal variability in student housing preferences.

6. Results

The analysis yielded a prioritised list of attributes, reflecting students' value judgments on both housing infrastructure and neighbourhood environment. The attributes were ranked based on their relative closeness to the ideal solution (Ca Score), indicating the degree of preference students associate with each feature. The findings are divided into three major thematic areas: core housing utilities, neighbourhood priorities, and lifestyle/social amenities, followed by a comparison of importance and satisfaction levels. The following table shows the top-most preferred attributes by the students

Table 4: Most Preferred Attributes (Top 10) These represent the core expectations of students from their rental housing:

Rank	Attribute	Code	Ca Score
1	24-hr Water Supply	H_PI_A	0.7243
2	Safe Locality	N_Safe	0.7176
3	24-hr Electricity with Backup	H_PI_C	0.6975
4	Privacy from Neighbours	H_Privacy_B	0.6873
5	Good Ventilation	H_Environ	0.6859
6	Secured Building	H_Safety_C	0.6844
7	Privacy from Landlord	H_Privacy_A	0.6712
8	Attached Washroom	H_Amn_B	0.664
9	Cost of Room	H_Cost	0.6547
10	Hi-Speed Wi-Fi / LAN	H_Amn_E	0.6543

Among the most preferred attributes, basic utilities emerged as the highest-ranking elements. The availability of a 24-hour water supply (H_PI_A) achieved the top position with a Ca score of 0.7243, underscoring the centrality of essential services in students' decision-making processes. This was closely followed by the safety of the locality (N_Safe), which ranked second with a Ca score of 0.7176. Similarly, the uninterrupted availability of electricity with backup (H_PI_C) and strong privacy considerations, such as protection from neighbours (H_Privacy_B) and landlords (H_Privacy_A), occupied subsequent ranks. These results point to a distinct prioritisation of practical, functional housing requirements over luxury or discretionary features.

The top ten attributes included other necessities like good ventilation (H_Environ), secured building structures (H_Safety_C), and the presence of attached washrooms (H_Amn_B), which ensure comfort, safety, and privacy. Cost of the room (H_Cost) also ranked in the top ten, indicating that affordability remains an important concern for students, although slightly below factors related to utility and personal space. High-speed Wi-Fi or LAN connectivity (H_Amn_E) closed the top ten list, reflecting the increasing importance of digital access for educational and social purposes. Together, these ten attributes form the essential pillars of students' rental housing expectations in Dehradun.

Neighbourhood-level factors also featured prominently, although they generally ranked slightly lower than internal housing conditions. Apart from safe locality, attributes such as nearby availability of photocopy shops, stationery, and convenience stores (N_Commercial), green space (N_Env), vegetable and fruit shops (N_Basic_Amn_A), and proximity to colleges or coaching centres (N_HEI) were identified as important. These preferences suggest that students value both environmental quality and access to essential goods and services within walking distance. However, recreational options such as cafés and gyms ranked lower in comparison, suggesting that students are more concerned with day-to-day functionality than leisure activities.

Table 5: Important Neighbourhood Factors

Rank	Attribute	Code
2	Safe Locality	N_Safe
13	Nearby Stationery/Convenience Shops	N_Commercial
15	Trees, Parks, Greenery	N_Env
18	Vegetable/Fruit Shops Nearby	N_Basic_Amn_A
19	Proximity to Institutions	N_HEI

Social and lifestyle attributes were consistently ranked lower in the priority list. Living with friends (H_Social_A), receiving housing recommendations from known persons (H_Social_K), staying close to other students or peers from the same academic stream (H_Social_B and N_Social) all ranked between 30 and 33. This indicates that while social relationships are valued, they are not primary drivers of housing choice. More striking is the low rank assigned to leisure and luxury features like air conditioning (H_Environ_INDOOR), gym facilities (H_Amn_H), common TV rooms (H_Amn_I), and indoor games rooms (H_Amn_F), which occupied the bottom quartile of the rankings. This pattern suggests that students in Dehradun exhibit pragmatic behaviour, prioritising essential services and affordability over social and recreational enhancements.

Table 6: Social and Lifestyle Attributes – Lower Priority

Rank	Attribute	Code
30	Living with Friends	H_Social_A
31	Friend's Recommendation	H_Social_K
32	Friends in Same Locality	N_Social
33	Living with Same Stream People	H_Social_B
60–74	Common TV Room, Games, AC, Gym	Multiple

The analysis also examined the satisfaction levels for the same set of attributes using student feedback on actual housing conditions. This was done by evaluating 'S-' prefixed variables such as S_H_PI_A for-water supply, S_H_PI_C for electricity backup, and S_H_Cost for room cost. The results show a partial alignment between perceived importance and actual satisfaction. For instance, while 24-hour water supply ranked first in importance, its satisfaction level was ranked 24th. Similarly, electricity backup ranked third in importance and 25th in satisfaction, and the cost of the room was ranked 9th in importance but dropped to 42nd in satisfaction.

This divergence suggests that even the most critical needs of students are not being fully met. The relatively lower satisfaction scores for essential utilities signal systemic shortcomings in the student rental housing sector in Dehradun. This gap becomes even more pronounced for lower-priority attributes. For example, satisfaction with leisure amenities like indoor games, gym facilities, and air conditioning was low, consistent with their bottom rankings in importance. This indicates that these features are often absent or poorly maintained in most rental accommodations, possibly due to the cost-sensitive nature of the market or lack of investment by landlords.

Overall, the results confirm the study's hypothesis that student housing decisions are primarily driven by functionality, affordability, and personal safety. A distinct hierarchy is evident: utilities and privacy come first, followed by affordability and digital access, then location and neighbourhood safety, and finally lifestyle or recreational amenities. The consistency between importance and satisfaction rankings in lower-tier attributes suggests that students may not expect these features, and their absence does not significantly influence housing

choice. However, for top-ranked attributes, dissatisfaction points to service delivery gaps that must be addressed to enhance student well-being.

This prioritisation matrix can serve as a strategic tool for housing developers, HEIs, and urban planners. By focusing investments and interventions on the highest-ranked attributes, especially those showing satisfaction deficits, stakeholders can improve service quality and align supply with actual student demand. Such a targeted approach would be beneficial in designing PBSA projects that cater effectively to the student population in mid-sized educational cities like Dehradun.

7. Discussion

The analysis from the TOPSIS model provided nuanced insights into the student rental housing landscape in Dehradun, particularly revealing a highly utilitarian orientation among student renters. This is strongly supported by the prioritisation of basic housing infrastructure such as 24-hour water supply, electricity with backup, secure buildings, and personal privacy, all of which dominated the top ranks in the importance score. These findings reinforce earlier literature from Najib et al. (2015), Ulyani Mohd Najib et al. (2011), and Oleńczuk-Paszel and Sompolska-Rzechuła (2024), where essential infrastructure was consistently rated as pivotal to student satisfaction.

What becomes apparent is that students renting in Dehradun adopt a pragmatic approach that balances affordability with service quality. This trend is echoed in broader research by Garmendia et al. (2012), who note that students prioritise locations and attributes that facilitate academic success and everyday comfort. In our study, the preference for safe locality, privacy, and stable digital connectivity illustrates this functionality-driven housing behaviour. Compared to leisure or community-driven aspects, these basic utilities take precedence. The finding that recreational amenities such as gyms, indoor games rooms, and AC facilities received lower rankings aligns with this notion and affirms the assertion made by Allinson (2006) and Sage et al. (2012) that Indian students often compromise on luxury to maximise affordability.

From a methodological standpoint, the use of TOPSIS enabled a rigorous multi-criteria prioritisation of housing features based on student preferences. This validates earlier claims by Cho and Chun (2015) that TOPSIS can function as an intuitive decision-making model for complex service evaluations. The model's use in this study made it possible not only to identify what students find important but also to quantify how well existing accommodations meet those expectations. This dual insight is especially valuable for planners and PBSA developers.

These student preferences reflect not only individual housing choices but are also manifestations of broader urban processes. The prioritisation of affordability, safety, and basic utilities in informal rental markets aligns with debates in urban spatial justice (Soja, 2010; Fainstein, 2010), which emphasise equitable access to essential urban services. The clear service deficits—particularly in security, internet, and infrastructure—reveal spatial and economic inequalities faced by students in rapidly urbanising yet under-regulated cities like Dehradun. These disparities underscore the need to treat student housing as a domain of distributive justice, where policy must ensure that socio-economically vulnerable groups like students are not excluded from safe and dignified urban living.

Importantly, the analysis revealed large service delivery gaps for certain attributes. Attributes like high-speed internet access, personal privacy (both from neighbours and landlords), food facility availability, and building-level safety infrastructure showed the largest discrepancies between importance and satisfaction scores. For instance, while Wi-Fi ranked 10th in importance, it was ranked 58th in satisfaction, signalling a rank gap of 48. Similar discrepancies were found for privacy-related features (gap of 45–46) and safety measures such as CCTV (gap of 45) and security guards (gap of 46). These insights point to an urgent need for systematic investment and regulation in the student housing sector in Dehradun.

The findings also echo the urban phenomenon of **studentification** (Smith, 2005), wherein the influx of students into residential areas transforms housing demand, affordability, and neighbourhood character. In Dehradun, informal PGs and shared flats reflect unregulated responses to rising student demand, often resulting in overcrowding and inadequate service delivery. This transition, while economically beneficial to landlords, imposes a socio-spatial cost on students—diluting their access to high-quality, affordable, and well-managed living spaces. These housing dynamics further strain local infrastructure and reinforce exclusionary spatial patterns, highlighting the need for integrated urban housing policies that anticipate and manage studentification processes. From a socio-spatial perspective, these mismatches reflect broader issues of spatial justice (Fainstein, 2010). The inequitable distribution of essential services—particularly in informal housing markets—suggests that students in tier-2 cities face structural disadvantages in accessing decent living conditions. Urban planning must thus not only address spatial proximity to educational institutions but also ensure equitable access to infrastructure and safety. Integrating spatial justice into student housing policy can support more inclusive development and reduce the marginalisation of student renters.

The implications of these findings are manifold. First, they call for a re-evaluation of the current rental housing stock in cities with large student populations. Informal PG accommodations and shared flats often lack standardised services, and landlords may overlook essential digital and physical safety features due to cost or apathy. As Oleńczuk-Paszel & Sompolska-Rzechuła, (2025) noted, a failure to address non-monetary quality factors such as soundproofing, temperature control, and internet stability can severely undermine satisfaction, even in otherwise affordable housing.

Second, the results serve as a foundational blueprint for the development of Purpose-Built Student Accommodations (PBSA). As students show strong preferences for features like 24-hour utilities, digital access, personal privacy, and safety, these must be treated as standard, non-negotiable provisions in PBSA design. Proximity to HEIs, ease of access to commercial establishments, and public transit connectivity—factors moderately ranked in importance—should also be considered to support everyday convenience.

Third, policymakers need to recognise the limitations of market-based rental solutions in addressing student needs. With most informal rentals failing to meet expected service standards, there's a growing case for municipal regulation or incentives for landlords to upgrade facilities. The findings also raise the question of enforcement: Are these gaps driven by the high cost of upgrades, a lack of tenant awareness, or sheer absence of regulation? These are crucial areas for future research and policy inquiry.

The preference-satisfaction gap also provides insights into behavioural economics in housing. Students may compromise on low-priority features but demonstrate dissatisfaction when core features like internet or water are missing. This is particularly evident in the large gap seen in food service satisfaction, suggesting students are highly dependent on external or communal food provisions and feel underserved. Similarly, dissatisfaction with privacy can be linked to overcrowding, shared facilities, or a lack of architectural segmentation in informal housing types.

Another layer of interpretation considers the spatial implications of these preferences. The importance of neighbourhood safety, commercial facilities, and green areas indicates that students are also evaluating their living environment beyond the physical confines of the house. This expands the relevance of the findings to urban planners, who must ensure that student-dense neighbourhoods are well-equipped with pedestrian safety, lighting, commercial nodes, and recreational space.

The study's results also highlight that digital infrastructure—particularly internet connectivity—is not a luxury but a necessity. This aspect of housing is often under-regulated in informal rental markets. With the academic and social life of students increasingly shifting online, future PBSA and urban housing developments must treat broadband access as an essential utility. Poor digital connectivity affects academic outcomes and isolates students from digital communities and services.

Moreover, findings around privacy and noise control speak to the need for more thoughtful architectural design. These features are hard to retrofit into existing informal housing but can be integrated into newly built PBSAs. For example, using thicker walls, designated study zones, and single-occupancy rooms can dramatically enhance privacy and satisfaction.

Overall, the preference–satisfaction gaps observed in this study not only signal service deficiencies but also map onto the larger socio-economic and spatial restructuring of mid-sized Indian cities under pressure from contemporary urbanisation. By embedding this analysis within the frameworks of spatial justice and studentification, the study situates individual housing struggles within systemic urban inequalities—offering theoretical and practical contributions to housing policy, urban planning, and academic research.

It is important to note that while the TOPSIS methodology provides clear rankings of attributes, it does not produce inferential statistical outputs such as p-values or confidence intervals. Therefore, while results like "Rank 24 in satisfaction" offer valuable prioritisation insights, they should be interpreted as descriptive rather than statistically significant. Future studies may incorporate inferential methods such as bootstrapping or Monte Carlo simulations to assess the robustness of rankings.

Finally, this research contributes methodologically by demonstrating how MCDM techniques like TOPSIS can be applied in urban and housing research. It allows for scalable, reproducible evaluations of tenant preferences and serves as a transparent tool for comparing different housing designs or policy interventions. When used alongside tools like Importance-Satisfaction Analysis, it enables the triangulation of perceptual data to inform actionable improvements. The TOPSIS model effectively quantified these priorities and revealed large service gaps in key areas. These gaps must be addressed through targeted interventions in rental housing design, policy, and PBSA planning. This study thus acts as both a diagnostic tool and a strategic guide for student housing stakeholders seeking to align supply with actual student demand.

8. Conclusion and Recommendations

This study has examined the housing preferences of students in Dehradun, India, using the TOPSIS methodology to rank a wide array of housing and neighbourhood attributes based on perceived importance and satisfaction. The results clearly indicate that students prioritise core utilities—such as 24-hour water supply and electricity—alongside safety, privacy, and affordability. Neighbourhood convenience, including the presence of basic shops and proximity to institutions, was also ranked highly, whereas social and leisure-oriented features such as common TV rooms, gymnasiums, and indoor games facilities ranked significantly lower.

One of the most crucial insights from this study is the mismatch between student expectations and the services currently provided in the rental housing market. Attributes such as high-speed Wi-Fi, CCTV surveillance, and food facilities exhibited some of the largest gaps between importance and satisfaction, highlighting a significant area for policy intervention and real estate investment. These findings underscore a clear need for targeted improvements in informal rental housing and the development of Purpose-Built Student Accommodations (PBSA) that are better aligned with students' priorities.

From a **policy transformation** perspective, the findings underscore the need for regulatory reform in the urban rental housing sector, especially in cities with large student populations. Local municipal authorities, in coordination with state urban development departments and higher education institutions, must consider integrating student housing into broader urban housing policy frameworks. This could involve creating **dedicated student housing regulations** that establish minimum infrastructure benchmarks—particularly for digital connectivity, water, sanitation, and safety. The use of the TOPSIS technique in this study has proven effective in offering a transparent, replicable, and evidence-based framework for housing preference analysis. This approach can serve as a decision-making tool for housing planners, institutional administrators, and urban developers, enabling them to prioritise investments in housing infrastructure based on actual user demand.

Additionally, **urban master plans** should incorporate student housing as a separate planning category. Designating zones for PBSAs near major education clusters, backed by fast-track approvals or financial incentives, could significantly improve housing outcomes. **Public-private partnerships (PPPs)** may also play a role in upscaling student-centric housing stock with embedded service-level guarantees. From a governance perspective, this study suggests a need to empower universities and student unions with consultative roles in urban housing governance. Establishing **student housing grievance redressal cells**, **standard rental contracts**, and **periodic housing audits** are immediate steps that municipal bodies can take to institutionalise quality assurance. From a governance perspective, this study suggests a need to empower universities and student unions with consultative roles in urban housing governance. Establishing **student housing grievance redressal cells**, **standard rental contracts**, and **periodic housing audits** are immediate steps that municipal bodies can take to institutionalise quality assurance.

While this study provides valuable insights into student housing preferences in a rapidly growing educational city, it is not without limitations. The research was confined to Dehradun, a tier-2 Indian city, which may limit the generalizability of findings to larger metropolitan areas or rural contexts. Additionally, the study used a cross-sectional survey approach, which captures preferences at a single point in time but may not reflect shifting priorities over time. The sample, though robust, comprised only full-time students aged 18–25, excluding non-traditional learners or postgraduate researchers who may have different needs. Further, the use of subjective perception-based data, while suitable for preference modelling, may not capture the full extent of structural inequalities in housing access. Lastly, while TOPSIS is effective for ranking preferences, it does not provide inferential statistical analysis to confirm causal relationships or significance testing.

Future studies should consider incorporating robust urban housing theories such as spatial justice, residential satisfaction frameworks, and studentification models. A comparative cross-city or cross-national analysis—particularly among emerging educational hubs like Pune, Hyderabad, and Ahmedabad—could yield broader insights into student housing needs. Additionally, the policy implications of informal vs. PBSA housing warrant further investigation, particularly in terms of affordability, spatial equity, and long-term liveability. Finally, integrating GIS-based spatial analysis or smart survey tools could enhance the precision and scalability of such housing assessments.

The findings from this study provide a clear basis for a set of integrated recommendations aimed at improving student rental housing in cities like Dehradun. First, essential utilities such as high-speed internet, 24-hour water supply, and power backup must be treated as non-negotiable features in student housing. Given the large dissatisfaction gap associated with digital connectivity, regulatory bodies should consider framing guidelines or minimum service standards to ensure consistent internet access across all types of accommodations. Safety and privacy emerged as highly valued yet under-delivered attributes. It is crucial for landlords and developers to incorporate basic safety infrastructure like CCTV systems, secure building access, and on-site security personnel. Similarly, the architectural design of shared living spaces must be enhanced to offer adequate physical and auditory privacy. Thoughtful room layouts, use of sound-insulating materials, and provision for individual study spaces can contribute to more satisfactory living environments. The formalisation and encouragement of Purpose-Built Student

Accommodations (PBSA) should be pursued through proactive policy measures. Planning authorities may designate specific zones for PBSAs near higher education institutions and offer incentives to developers who adhere to student-centric design norms. At the same time, municipal bodies should consider developing a certification or rating system for student rentals, which can help students make informed housing decisions. On the awareness front, students need access to resources that inform them of their rights and responsibilities in the rental market. Universities, in collaboration with legal aid societies, can offer orientation programs that address rental agreements, dispute resolution, and available grievance redressal mechanisms.

Lastly, while this study focused on a single urban context, the broader implication points toward the necessity of nationwide efforts to standardise and improve student rental housing. Future studies can focus on comparative studies across other urban educational hubs, and longitudinal analyses can guide more adaptive housing policy and design. Stakeholders must also explore the socio-economic trade-offs between PBSA models and informal rental setups, particularly in terms of affordability, accessibility, and quality of life.

Acknowledgements
The authors would like to express their gratitude to the student participants in Dehradun who shared their time and perspectives, which formed the foundation of this research. The authors also acknowledge the support of the Department of Architecture and Planning, Indian Institute of Technology Roorkee, for providing academic guidance and resources.

Funding
This research was supported by a grant from the **Ministry of Human Resource Development (MHRD), Government of India**..

Conflict of Interests
The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability statement
The original contributions presented in the study are included in the article and its supplementary material. Further inquiries can be directed to the corresponding author(s).

Institutional Review Board Statement
Not applicable.

CRediT author statement
- **Dikchha Tiwari (Ph.D. Candidate)**: Conceptualization, Methodology, Data Collection, Data Analysis, Writing – Original Draft Preparation.
- **Dr. Uttam Kumar Roy (Professor)**: Supervision, Validation, Writing – Review & Editing, Project Administration.

All authors have reviewed and approved the final version of the manuscript.

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