

Assessing Thermal Comfort and its Impact on Student Satisfaction in Selected Hostels at Caleb University, Imota, Lagos State

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Abstract

Whether residential, commercial, educational, or industrial buildings, the level of comfort derived within space is a function of how conducive it is. Environmental factors are a key determinant that cannot be overlooked as a major player to satisfaction. Parameters like indoor air quality, acoustic comfort, thermal comfort and visual comforts are usually considered under it. A satisfying space relaxes and rejuvenates the occupant making them productive within or outside depending on the type. To this end, the study assessed the impact of thermal comfort on students' satisfaction in selected hostels at Caleb University, Imota, Lagos State. 727 students responded to the structured questionnaire survey that was administered through google form comprising of both open and closed-ended questions. The responses were analyzed using SPSS and result presented. The finding reveals that thermal discomfort in student accommodations frequently resulting from inadequate temperature control impairs sleep quality and adversely affects academic performance and overall well-being. The placement of windows is crucial in determining thermal comfort, demonstrating the most significant correlation with students' overall life satisfaction. The study concluded that a large proportion of students report health effects because of uncomfortable temperatures. This could include respiratory problems, headaches, and other illnesses exacerbated by poor heat control. To increase students' comfort and contentment in hostels, the main recommendation is to focus on lowering heat-related discomfort, as this has the largest impact on overall satisfaction. Hostel designs should focus on thoughtful window placement to boost thermal comfort, which in turn can enhance students' sleep quality, academic success, and overall health.

Keywords: Comfort, indoor environmental quality, thermal comfort, student hostels, student satisfaction.

1.0 Introduction

Accommodation/housing refers to the plural of the facilities offered by buildings and other installations, which are usually of a spatial or functional nature. It includes areas used or intended for residential by boarding houses, hostels, guest houses, services apartments, services rooms, and the like. It is one of the most important needs for human survival, ranking among the top three [1]. Different types of accommodations are distinguished by their features, sizes, and styles. [2] highlighted how important housing is to a person's welfare, its ability to support themselves, and chance of survival. It has been and will continue to be of utmost importance to the individual, family, community, and the country. Hostel accommodation is of importance to students' comfort in the university environment as the primary purpose is to create a comfortable living and sleeping environment for their occupants [2]. The main determinants of students' happiness with hostel accommodations are their accessibility, sufficiency, and usability.

In this study by [4], they opined that many students in public places, such as hostels, experience dizziness, sweating, headaches, coughing, drowsiness, and general discomfort due to the nature of the activities taking place, such as cooking, rowdiness, and the tightness of the building. The impact of IEQ elements on students' academic achievement, health, and well-being is noteworthy in educational contexts [3]. The Health and Safety Executive (1999) stated that environmental elements are directly proportional to the level of comfort experienced by humans in any place, which translates to productivity [6]. As a result, polluted hostels or classrooms may increase the risk of short and long-term health problems for students and staff, reducing productivity and students' learning opportunities. Satisfied space relaxes and rejuvenate the occupant making them productive within or outside depending on the type [4]. The degree to which students are satisfied with their hostel experience is intrinsically subjective and based on their own expectations and reference frames [5]. To this end, this study assessed the effect of thermal comfort on students' wellbeing in selected students hostels of Caleb university, Imota, Lagos with a view to examine the degree of satisfaction. The general objectives seek to identify the demographic characteristics

of the respondents; assess the students' perception of thermal comfort within the selected hostels; and determine the relationship between thermal comfort and overall satisfaction of students in the hostels.

1.1 Literature Review

Caleb University, Lagos

Caleb University is a private institution in Imota (a suburb of Lagos) Lagos State, Nigeria. Figure 1 shows a google map of Caleb University, Lagos. It was created in 2007 and one out of 149 private universities with 123 being public, bringing the total to 272. Currently, according to [6] report, private universities account for 54% of the total Universities in Nigeria. Caleb University has different categories of hostel facilities with the highest being six-bedded. The other includes two and four bedded rooms respectively. Each of the hostels is planned differently. Six-bedded, four-bedded and two-bedded ensuite rooms on each floor, accompanied by shared amenities such as a general toilet and common room. Allocation of which is determined by the amount paid for accommodation. This is also determined by the availability of the rooms. More hostels were constructed in response to growing enrolment, geographic dispersion of students, and a desire to improve educational access. With the continued development of hostels, it is critical to promote and maintain appropriate indoor environmental quality, as the impact of these spaces on their users must be carefully considered.

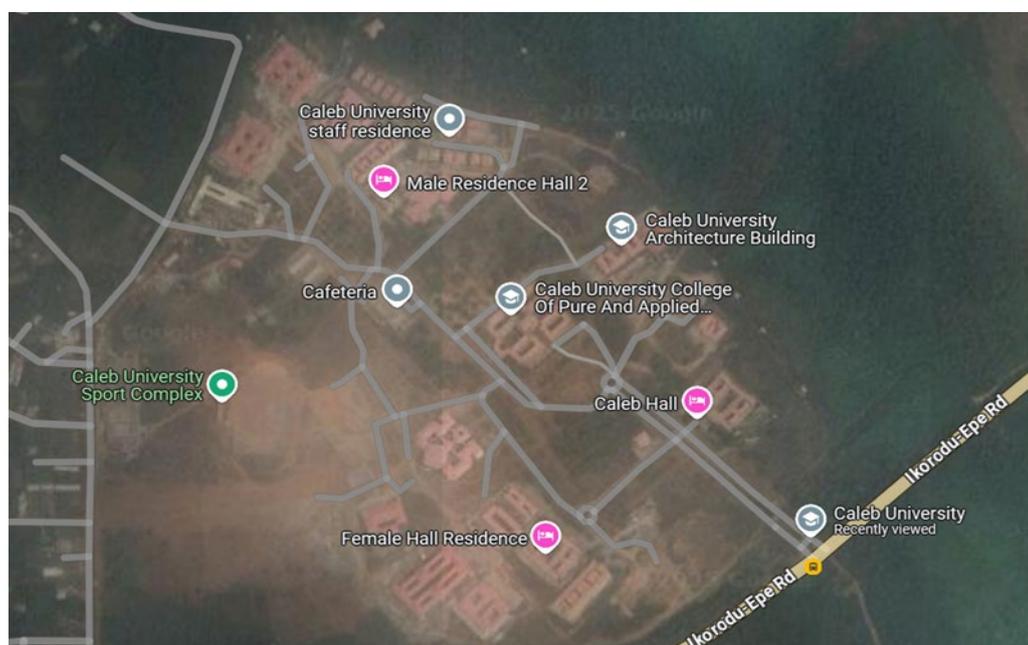


Figure 1: Map of Caleb University, Imota, Lagos
Source: Google map (2025)

Student Hostels

The most significant stakeholders in every educational institution are the students [7]. Komal *et al.* (2023) indicated that satisfaction among students is influenced by residential facilities, study environments, and relationships among residents. A safe and healthy environment can improve students' health and revitalise dynamic learning. Satisfaction of their spaces is the degree to which a student subjectively evaluates the various outcomes and experiences associated with education favourably [4]. The impact of environment and accommodation on student satisfaction is a common study topic and relevant for institutions [9]. However, the activities that take place in public spaces like hostels, such as cooking, rowdiness, and cramped quarters, might cause several students to experience symptoms like headaches, dizziness, sweating, coughing, and general discomfort. As a result, dirty hostels or classrooms may raise the risk of both immediate and long-term health issues for both staff and pupils, which will lower teacher productivity and pupil learning opportunities [10]. In their study [11], highlighted the main element influencing students' decision to stay in hostel as convenience. This is due to the walking distance to lecture halls, the lack of having to get up too early for a morning class, and the convenience of taking a shower between courses or returning to the hostel to retrieve a forgotten item. It was also shown that the population in the space where the residence is located (whether on or off campus) has a significant impact on residence selection, as students choose low-density locations over high-density ones.

Students' satisfaction hostel spaces

Satisfaction is the feeling that comes from comparing what was received to what was anticipated or from meeting needs/desires [12]. [13], in their work on "the influence of housing attributes on housing satisfaction" stated that satisfaction with housing conditions indicates the fulfillment of expectations or a high level of harmony with the desired situation. Their research confirmed that indoor air quality, individual space, building privacy, condition of building materials, and indoor lighting play a role in determining people's satisfaction with their building's features. Student satisfaction is the extent to which a student's personal evaluation of their educational experiences and outcomes is positive as their continual exposure to college experiences influences the happiness levels of students over time [14]. Still, the contentment and joy of students rely on the extent to which their needs and expectations are fulfilled.

The satisfaction of students living in sustainable accommodation is greatly impacted by the standard of on-campus hostels. [9] put it forward that students become more independent after living in a sustainable on-campus hostel, where they share a room with no more than four other students at a time. Also, resident happiness with students is dependent on decent living facilities, a calm study atmosphere, and positive roommate relationships. It is an important metric for evaluating student housing amenities. Good accommodation has a tremendous impact on students' studies [8].

However, [9] outlined that student satisfaction is related to factors such as recruitment, retention, and academic performance, all of which are important university considerations. In today's higher education, there is a strong association between student satisfaction and academic success. It has sparked substantial interest among academics and teaching practitioners due to its ability to deepen already strong synergies within the student experience [14]. Similarly, the nature of residents' prosperity and satisfaction is more fundamental, as it is influenced by building quality constraints [1].

Impact of Thermal Comfort on satisfaction

One of the most crucial factors in building design is keeping a comfortable thermal climate in mind [15]. According to [16], a structure "that meets the needs of at least 80% of occupants" is considered thermally comfortable. Stressing that, to protect the health and comfort of its occupants, enclosed spaces typically have controlled air and temperature. [17] concluded that an environment can be regarded to achieve 'reasonable comfort' if at least 80% of its occupants feel thermally comfortable. The importance and weight of IEQ components vary, which can be attributed to varied climates, building kinds, and human characteristics.

Thermal comfort is determined by two factors: environmental conditions and personal characteristics. Environmental criteria include air velocity, temperature, and relative humidity, whereas personal aspects include human body insulation via clothes and metabolic rates [18]. Thermal comfort is a crucial and easily measurable indicator of indoor environmental quality. For occupants to perform to their best potential, their work environment must be thermally pleasant [19].

Building dimensions, window-wall ratios, shading systems, building orientation, classroom articulation, and building envelope characteristics all have a direct impact on a building's thermal comfort. Building orientation, size, window-wall ratio, shading systems, classroom articulation, and building envelope characteristics are all closely linked to thermal comfort in buildings [20]. The combination of various meteorological conditions, building physical qualities, and spatial elements creates the indoor thermal environment.

The human body adjusts to temperature changes through thermal comfort, which is an essential part of survival behaviour. Movements can be made consciously or unconsciously to maintain body temperature [21]. Thermal comfort results from a variety of conscious and unconscious interactions between three domains. They include physiological, physical, and societal aspects, as well as human attributes. Thermal comfort is determined by individual occupant thermal adaptation, which is influenced by factors such as geographic location and climate, season, gender, race, and age [22].

2.0 Methodology

The study adopted primarily a quantitative method of inquiry administered through structured closed ended questions administered electronically through google form. The study's population consists of students from 727 Caleb University's designated male and female students in selected dorms. They include female hostels – Rebecca and Susannah, while Levi, and Elisha are the selected male hostels. Questions were asked using the Likert scale satisfaction 1-5 ranging from strongly satisfied as 5 to dissatisfied as 1. Valid responses regarding each question were carefully selected and analyzed. The results presented didn't present the same number of responses due to the validity of what was received in the range of 705 to 710 responses. The study was conducted in three months and results analyzed and presented through tables and charts – histogram and bar charts.

3.0 Results and Discussions

Based on objective one of this study, which pertains to the demographic characteristics of the respondents, as shown in figure 2: The total sample size is 727 respondents. Valid replies were collected from 710 -711 participants in several areas such as academic level, hostel name, housing on campus, and length of stay.

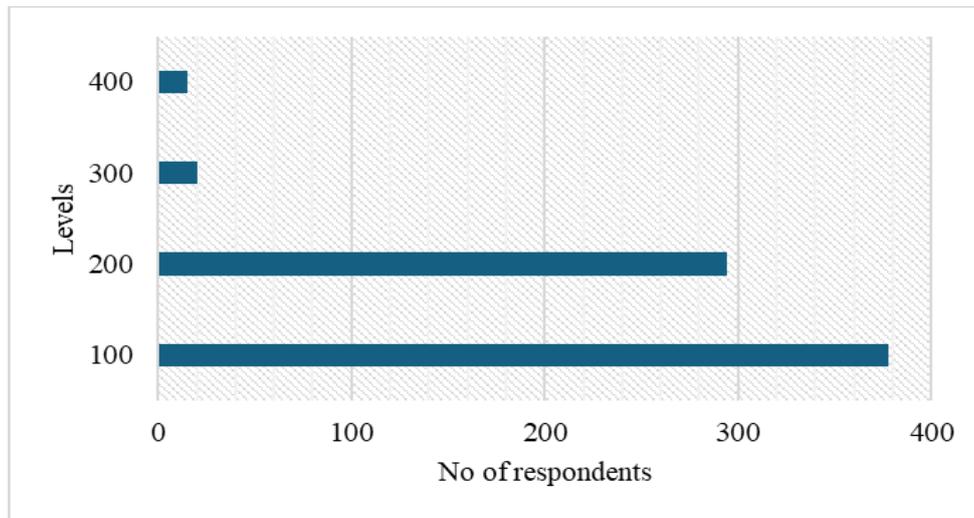


Figure 2: Demographic Characteristics – Academic level

Source: Author *et al.* (2025)

From figure 3, Rebecca Hostel is the most prevalent hostel where students stay, accounting for 44.3% of all replies. Elisha Hostel has 22.8% of the replies, followed by Levi Hostel (20.7%) and Susana Hostel (12.2%). The distribution shows that Rebecca Hostel is substantially more popular than the other three hostels, which could indicate a larger capacity or a preference for Rebecca among students.

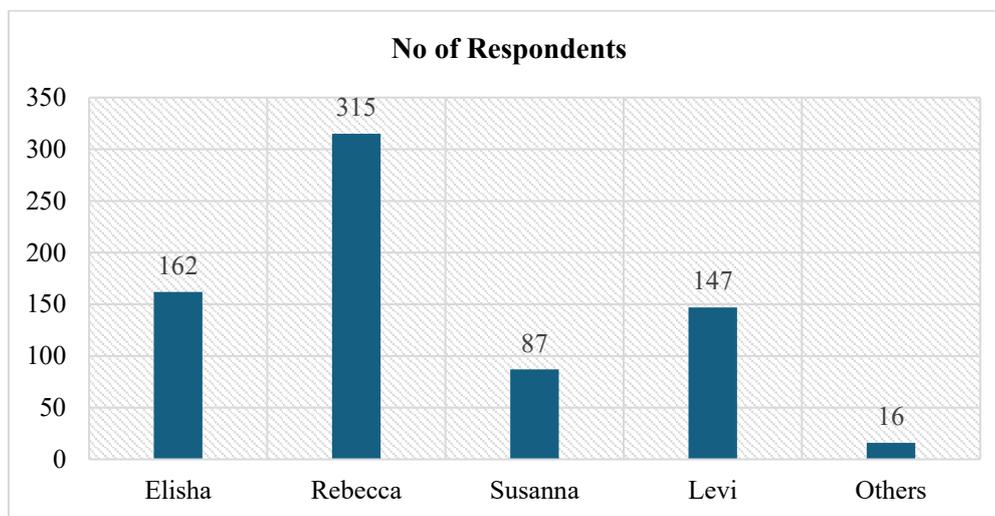


Figure 3: No of respondents in the selected hostels

Source: Author *et al.* (2025)

Table 1: Students’ perception of thermal comfort in Hostels

Statistics	Thermal comfort	Too hot	Too cold	Use of clothing	Bedding to regulate	Opening of windows	Health issues	Sleep disorder	Customize d clothing
No	710	710	710	710	710	705	710	710	710
Mean	2.36	2.72	2.70	2.84	2.77	1.56	2.60	1.58	1.60
Std. Deviation	1.041	1.460	1.292	1.279	1.315	.497	1.290	.494	.491

In Table 1, the mean score for experiencing health concerns linked to thermal discomfort is 2.60, with a standard deviation of 1.290, indicating that a sizable proportion of students report health-related consequences

from uncomfortable temperatures. This could include respiratory difficulties, headaches, and other diseases made worse by inadequate heat control. Thermal discomfort appears to have an impact on students' sleep, with the mean score for sleep disorders being 1.58 (SD = 0.494). Although this is a modest score, it suggests that some students' sleep quality is disrupted owing to temperature discomfort, which may have an influence on their academic performance and overall well-being.

The mean score for using customised clothing (particularly, dressing in methods designed to cope with dormitory temperatures) is 1.60, with a low standard deviation of 0.491. This shows that only a tiny proportion of students use customised clothes for thermal management, which could be attributable to cultural or personal clothing preferences. According to the research, thermal discomfort is a major problem for students in hostels, with many describing their living environment as either excessively hot or too cold. They usually rely on wardrobe and bedding modifications to control their comfort, despite the limited usage of windows for ventilation. Thermal discomfort also has an impact on students' health and sleep, which may affect their general well-being. This emphasises the need for better heat regulation in dormitories to increase student satisfaction and health outcomes.

Table 2: Relationship between thermal comfort and students' satisfaction

Correlation			Satisfaction with no of windows	Window positioning	Overall satisfaction	Satisfied when the room is too hot	Satisfaction when the room is too cold
Spearman's rho	Satisfaction with no of windows	Correlation Coefficient	1.000				
		Sig. (2-tailed)	.				
		N	710				
	Window positioning	Correlation Coefficient	.172**	1.000			
		Sig. (2-tailed)	.000	.			
		N	710	710			
	Overall satisfaction	Correlation Coefficient	.073	.251**	1.000		
		Sig. (2-tailed)	.050	.000	.		
		N	710	710	710		
	Satisfied with too hot room	Correlation Coefficient	.103**	.085*	.135**	1.000	
		Sig. (2-tailed)	.006	.024	.000	.	
		N	710	710	710	710	
Satisfaction with too cold	Correlation Coefficient	.024	.006	.081*	.137**	1.000	
	Sig. (2-tailed)	.523	.869	.031	.000	.	
	N	710	710	710	710	710	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 2 displays the Spearman's rank correlation data, which illustrate the strength and direction of the relationship between several variables connected to students' satisfaction with the thermal environment in their hostels. There is a positive but modest association ($r = 0.172$, $p < 0.01$) between satisfaction with the number of windows and window positioning, implying that students who are satisfied with the number of windows in their rooms are also likely to be satisfied with the window placing. There is a weak, non-significant association ($r = 0.073$, $p = 0.050$) between contentment with the number of windows and overall satisfaction with the thermal conditions at the hostel. This suggests that, while the number of windows matters, it is not an independent factor of total pleasure. A weak but significant link exists ($r = 0.103$, $p < 0.01$) between contentment with the number of windows and satisfaction with the room being too hot. This shows that having more or better-positioned windows may increase comfort in extremely hot weather. The relationship between contentment with the number of windows and satisfaction with very cold rooms is modest and non-significant ($r = 0.024$, $p = 0.523$). This suggests that the number of windows has no significant impact on pleasure under cold room circumstances. Window location has a moderately favourable link with overall satisfaction ($r = 0.251$, $p < 0.01$). This shows that properly positioned windows have a considerable impact on students' satisfaction with their thermal environment.

Overall satisfaction with thermal comfort has a weak but significant link with satisfaction in very hot rooms ($r = 0.135$, $p < 0.01$). This implies that thermal comfort in too hot conditions has a moderate impact on satisfaction among students. The correlation between overall satisfaction and contentment in cool conditions is small but substantial ($r = 0.081$, $p < 0.05$). This shows that very cool circumstances impair students' overall satisfaction, albeit to a smaller extent than hot conditions. There is a slight positive correlation between satisfaction in too hot and cold rooms ($r = 0.137$, $p < 0.01$). This shows that pupils who manage thermal discomfort in hot conditions are more likely to manage or adapt to cold ones, meaning that the students may be resilient or adaptable in dealing with both extremes.

Overall, window positioning has the strongest link with satisfaction with life, indicating that window placement is critical to thermal comfort. Satisfaction with too hot settings has a greater impact on overall satisfaction than with too cold ones, implying that thermal discomfort caused by heat is more bothersome for students than cold. While the number of windows has an impact on satisfaction, it is rather minimal, especially in cold situations. The results indicate that improvements in window location and heat management are critical factors in increasing students' comfort with the thermal environment in their hostels.

4.0 Conclusion and recommendation

This study concludes that demographic factors such as degree of study, length of stay, and hostel accommodation provided critical background for understanding students' responses to thermal comfort. The sense of thermal comfort, particularly related to heat, had a substantial impact on students' satisfaction. Although adaptive behaviors were commonly used, their overall effectiveness in increasing pleasure was limited. To improve students' comfort and contentment in hostels, the key recommendation is to focus on reducing heat-related discomfort, which has the greatest impact on overall satisfaction. Addressing these thermal issues may result in better health outcomes, higher sleep quality, and a more enjoyable residential experience for students.

To improve natural ventilation, increase in the number of windows or the need to make sure that existing ones are functional and easily moveable. In addition, the use of window treatments such as blinds or reflective films will aid in temperature control while allowing natural light in. Additionally, on the part of the students, there is a need to promote the usage of permeable clothing and bedding to maintain personal comfort. Providing guidance on when to open windows and how to efficiently control thermal comfort in response to weather conditions.

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