

AS01 - IEQ

Performance and Behavior Research

Indicative

Our research examined whether the thermal comfort (TC) and indoor air quality (IAQ) levels in Studio 318-320 align with design standards and whether occupants find them satisfactory.

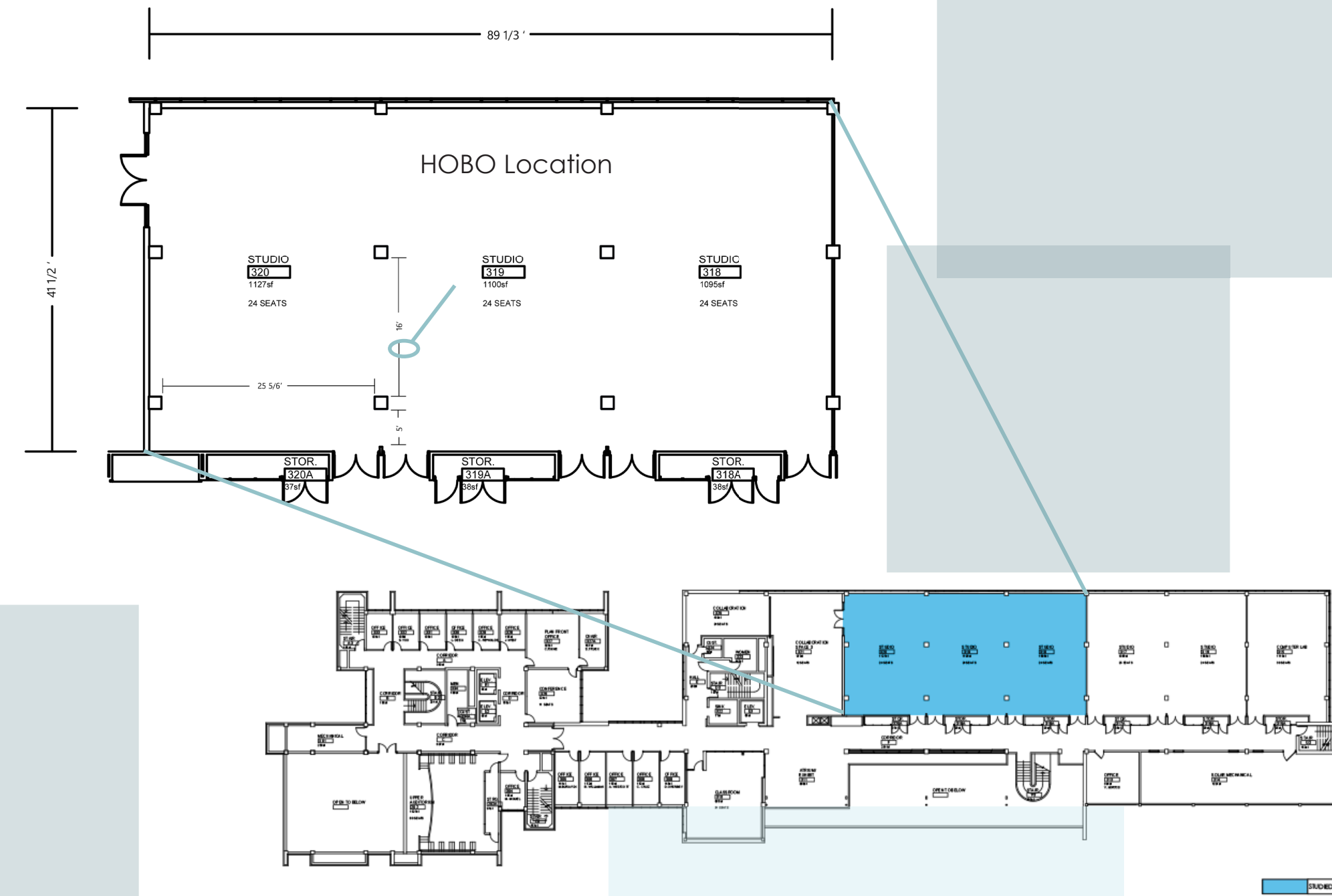
Investigative

Hypothesis: The indoor environmental quality of the space will be insufficient for occupants, and its thermal comfort will not meet their satisfaction.

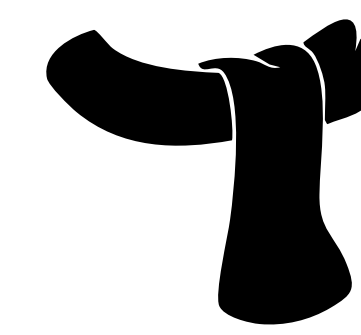
Diagnostic

Two distinct methods were employed to collect data for this study: a HOBO sensor to measure indoor environmental conditions and an occupant survey to assess subjective thermal comfort. The variables for the equipment were temperature and relative humidity, while the survey variables included attire, activity, thermal sensation, lighting environment, indoor air quality, and thermal comfort. Both the HOBO sensor data and survey responses indicate that the indoor environment is too hot, with measured temperatures exceeding comfort thresholds and occupants reporting feeling warm. Thermal comfort satisfaction received the lowest ratings, and many chose shorts and short-sleeve t-shirts despite the cold outdoor conditions. These findings suggest that building management should consider lowering the heating, even in light of the colder outdoor temperatures. Additionally, individuals can take various measures to cool themselves in this warm, dry environment.

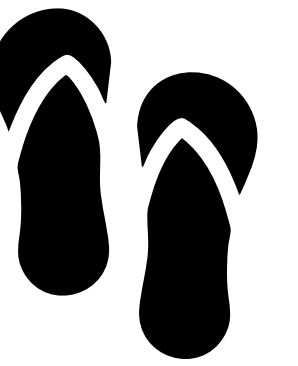
Studied Space



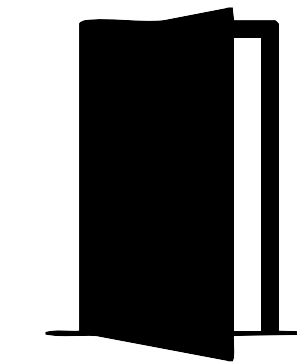
Occupant Behavior



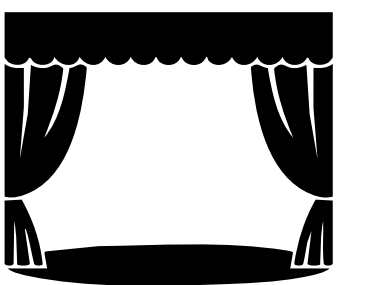
Cooling Wrap



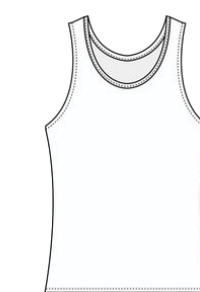
Light footwear



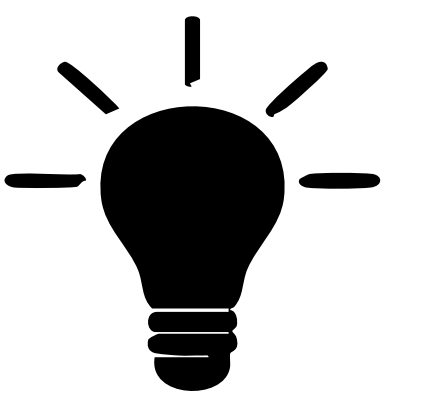
Open Doors



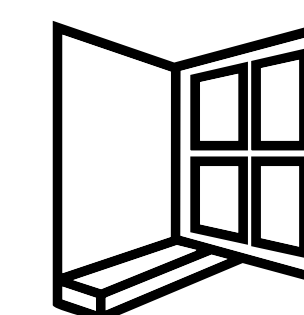
Close Curtains



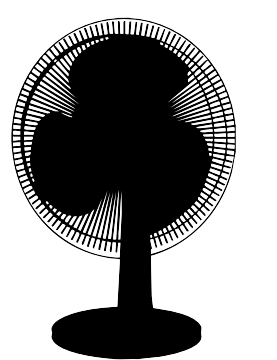
Wear Light Clothing



Change out Lighting

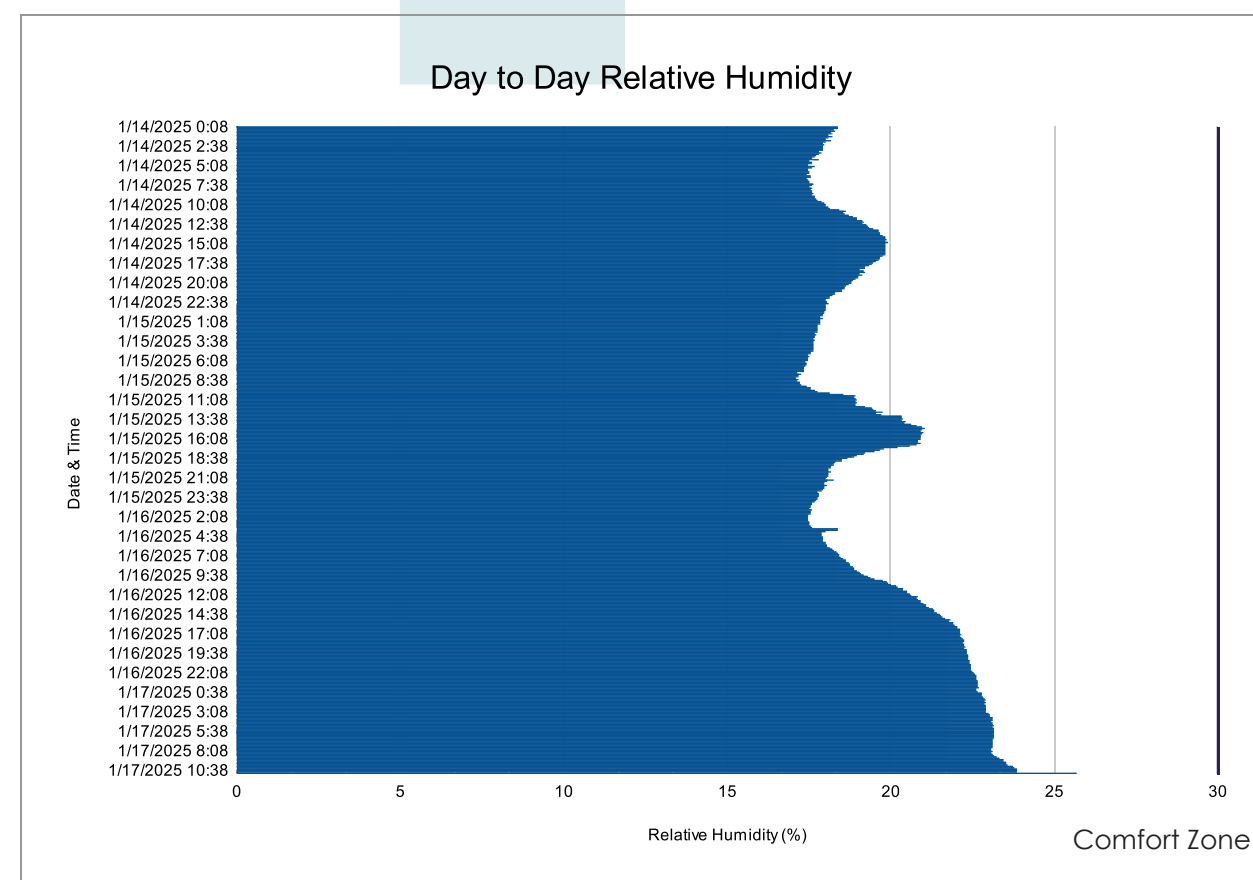


Open Windows

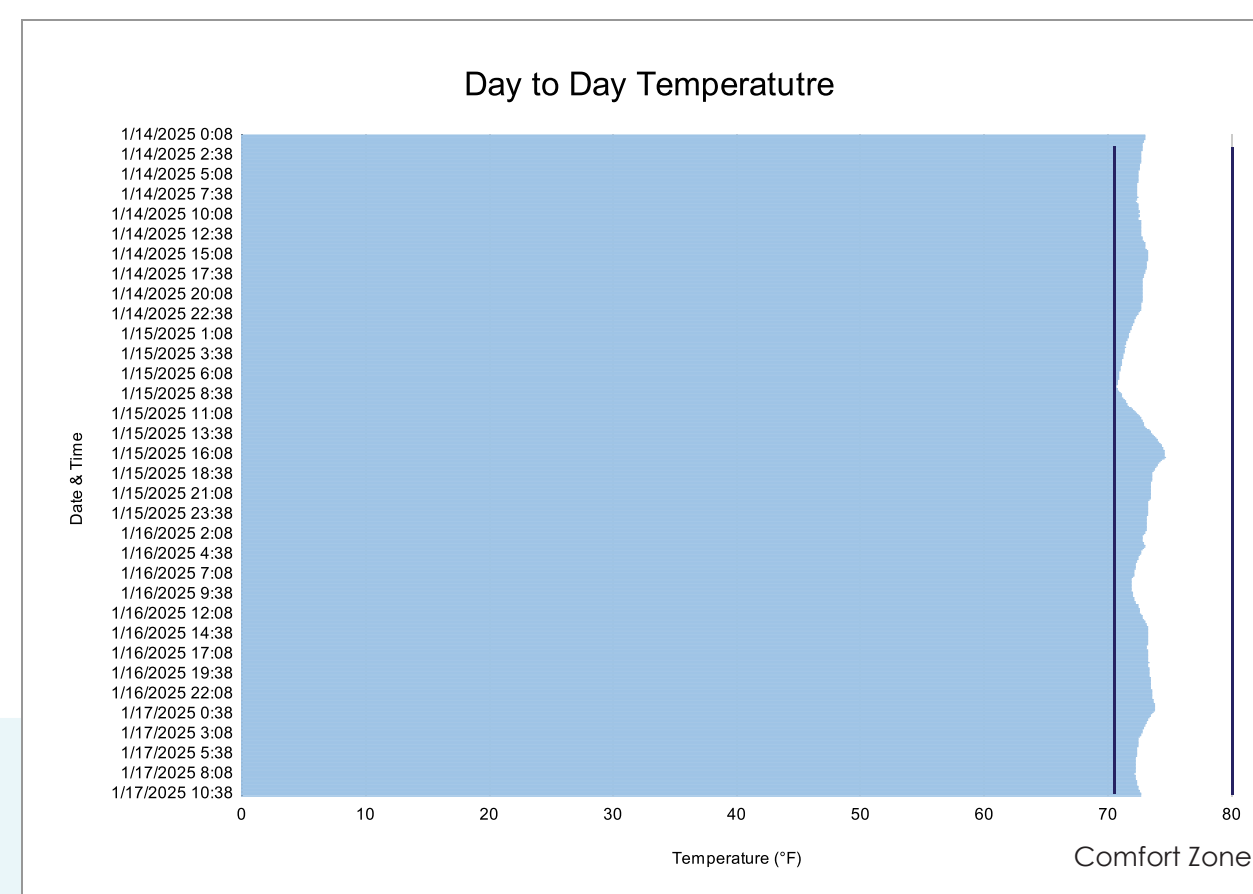


Tabletop Fans

Diagnostic

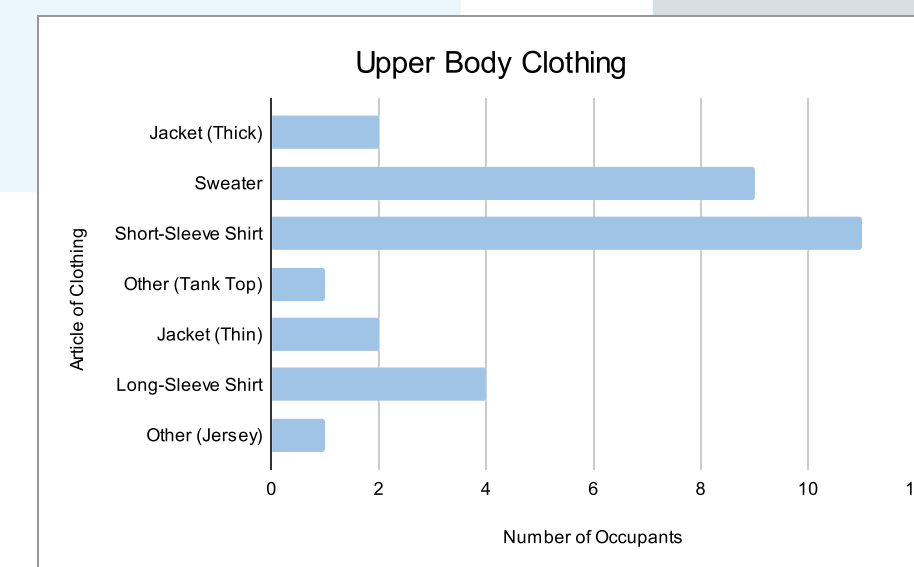


The graph displays relative humidity (RH) readings from January 14 to 17, 2025, with RH levels ranging from 0% to 25%. None of the readings fall within the acceptable code range of 30% to 50%, indicating that the humidity levels are consistently too low. This suggests that the environment is drier than recommended, which could lead to discomfort or other issues depending on the context. The data shows some fluctuations, but all values remain below the minimum acceptable threshold. To comply with the code requirements, adjustments to the humidity control systems may be necessary to increase and maintain RH levels within the 30% to 50% range.

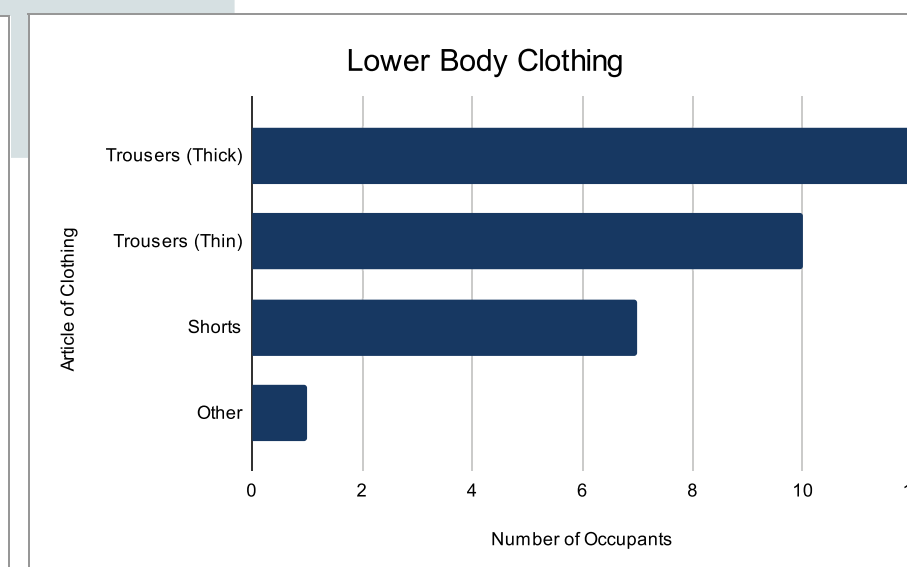


The graph shows temperature readings from January 14 to 17, 2025, with temperatures ranging up to 80°F. While there are fluctuations, none of the readings fall below 68°F. However, some temperatures exceed the maximum code acceptance limit of 76°F. This indicates that while the room stays above the minimum requirement, it occasionally goes above the acceptable range. Adjustments to the cooling system may be needed to ensure temperatures remain within the 68°F to 76°F range.

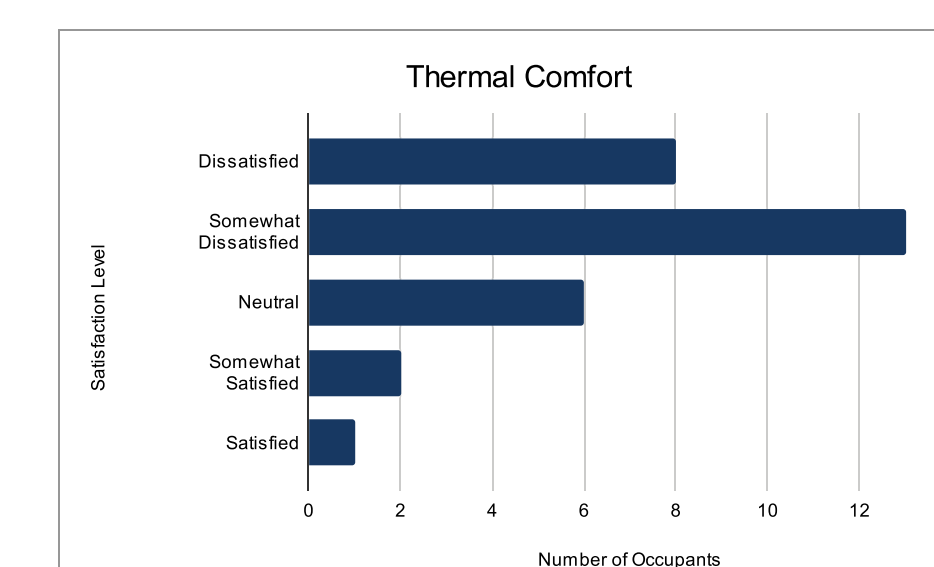
Occupant Surveys



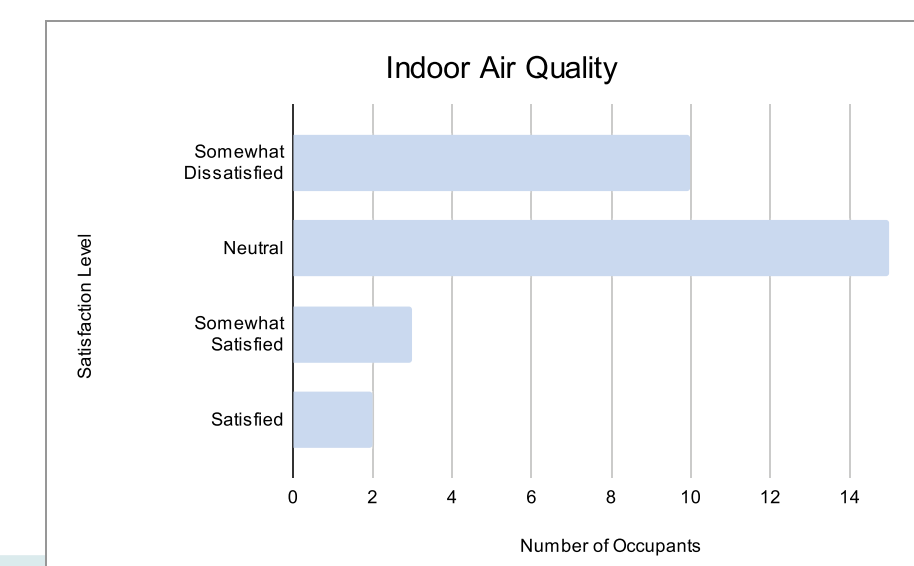
The most common upper body clothing choices among the 30 responders are "Sweater" and "Short-Sleeve Shirt," indicating a preference for moderately warm or lightweight options. Less common choices include "Jacket (Thick)" and "Long-Sleeve Shirt," while "Other (Tank Top)" and "Other (Jersey)" are the least popular. This suggests the environment is likely moderately cool or variable, leading to versatile clothing selections.



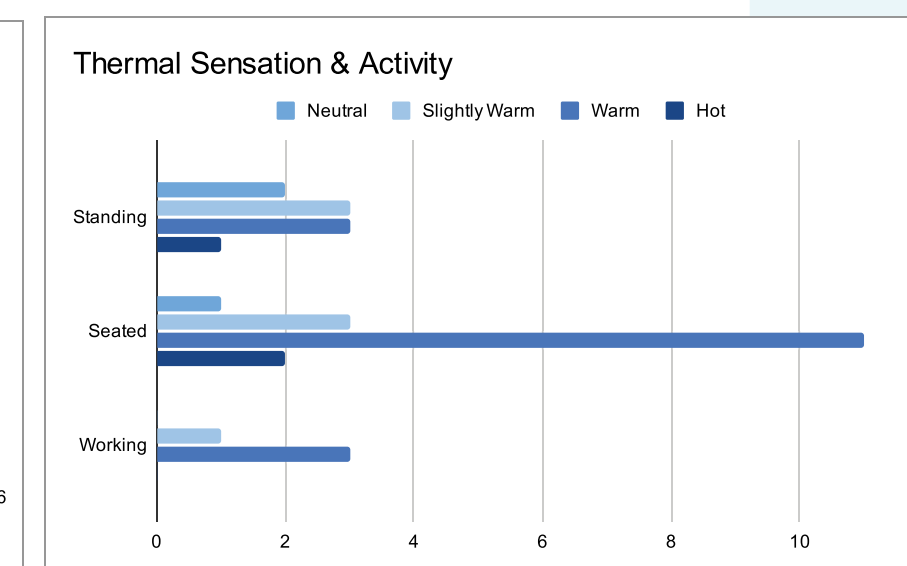
The most common choice is "Trousers (Thick)," followed by "Trousers (Thin)" and "Shorts," with "Other" being the least selected. This indicates a preference for warmer or more protective lower body clothing, likely due to cooler or variable environmental conditions. The presence of shorts suggests some occupants may find the conditions mild enough for lighter attire.



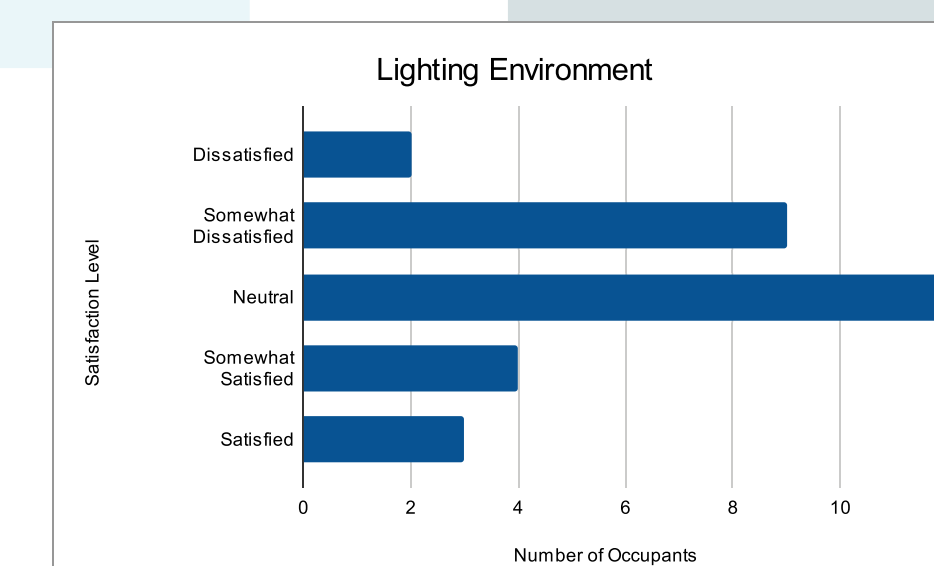
Most occupants report being "Dissatisfied" or "Somewhat Dissatisfied" with their thermal comfort, indicating significant discomfort, while few feel "Neutral" or "Satisfied." This suggests the current conditions do not meet occupant needs, requiring better temperature regulation or environmental controls. Thermal comfort was the most dissatisfying IEQ variable, possibly due to limited control over heating, ventilation, or individual differences in metabolism and clothing.



The majority of occupants report being "Somewhat Dissatisfied" or "Neutral" regarding indoor air quality, indicating a significant level of discomfort or indifference. Only a few feel "Somewhat Satisfied" or "Satisfied." This suggests that the current indoor air quality may not be meeting the needs of most occupants, and improvements in ventilation or air filtration could help enhance overall satisfaction.



The data indicates that occupants generally feel "Warm" or "Slightly Warm," mainly when seated or working, activities associated with lower metabolic rates, while fewer report "Neutral" or "Hot" sensations. This suggests that the environment may be too warm for comfort during these low-exertion activities. Improving temperature regulation or ventilation could help achieve a more neutral thermal comfort level.



Most occupants report being "Somewhat Dissatisfied" or "Dissatisfied" with the lighting environment, indicating discomfort, while fewer feel "Neutral" or "Satisfied." This suggests the lighting does not fully meet occupant needs, and improvements may be necessary. However, among all indoor environmental quality (IEQ) variables, lighting was the most satisfying, indicating greater dissatisfaction with other factors.