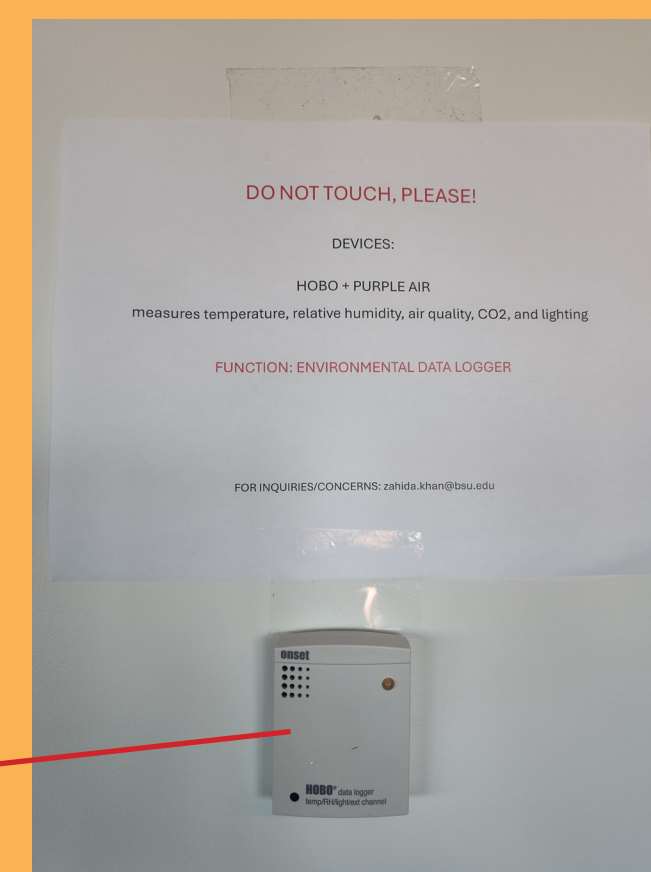
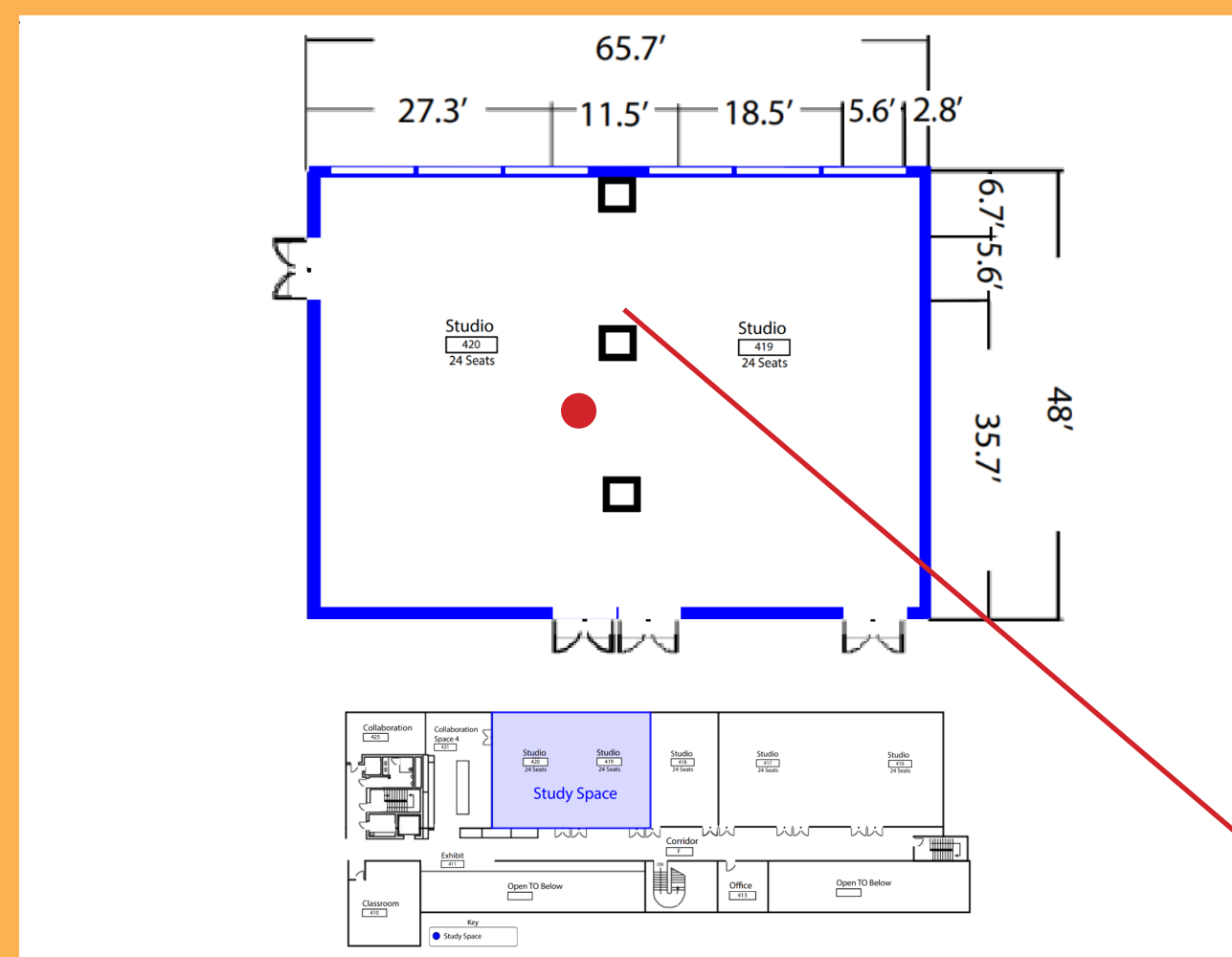


AS01 - Performance & Behavior: Room 419/420

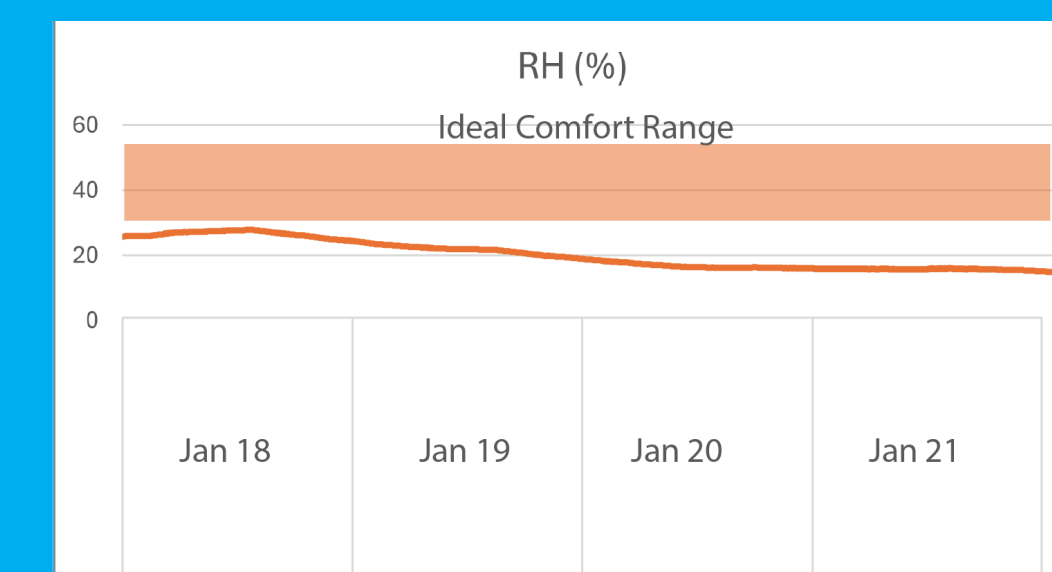
Adam Mick, Alan John, Kayla Lawrence, Adrian Carbonell, Teddy Mapeka
Environmental Systems - ARCH273
Spring 2025
Professor Khan
Ball State University



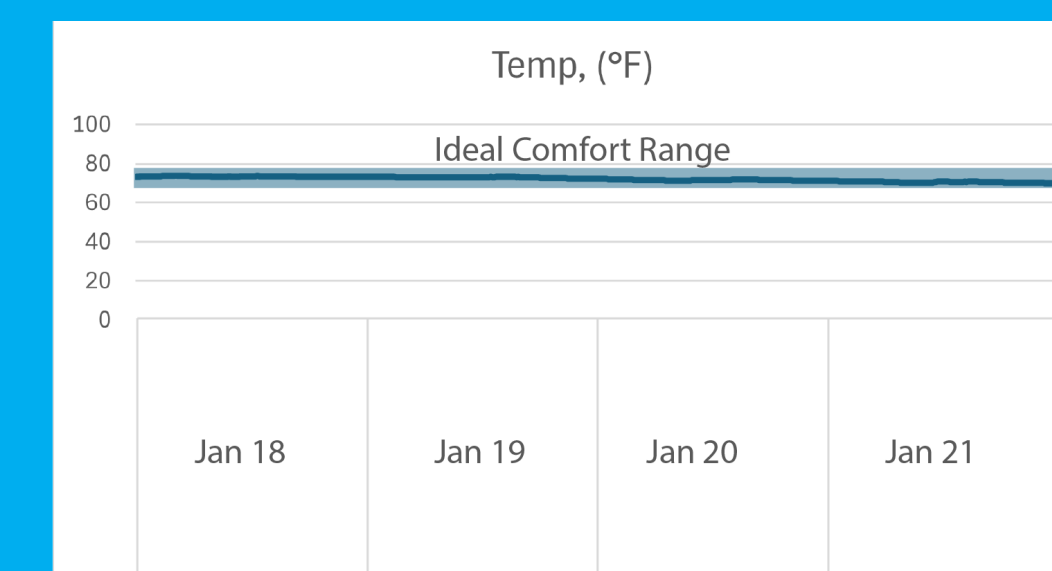
CAP Building, Room 419/420



HOB0 Data

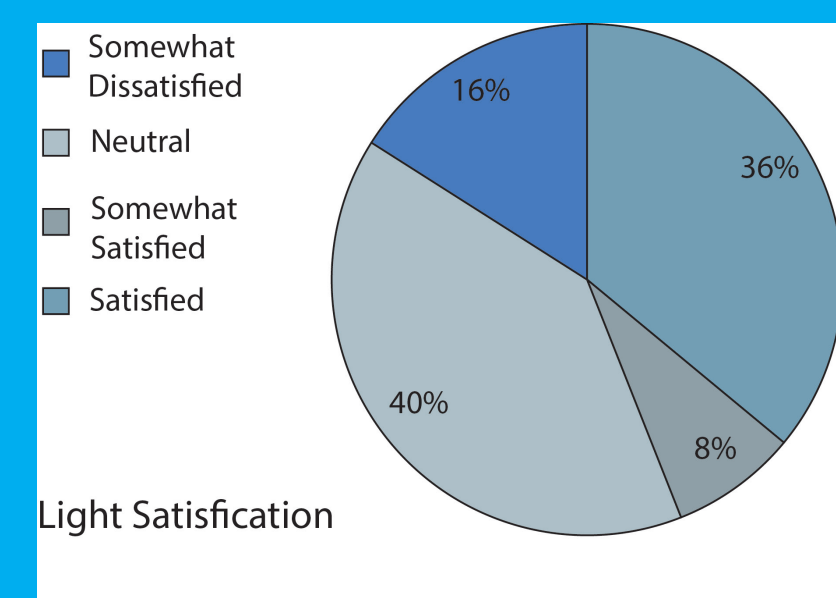
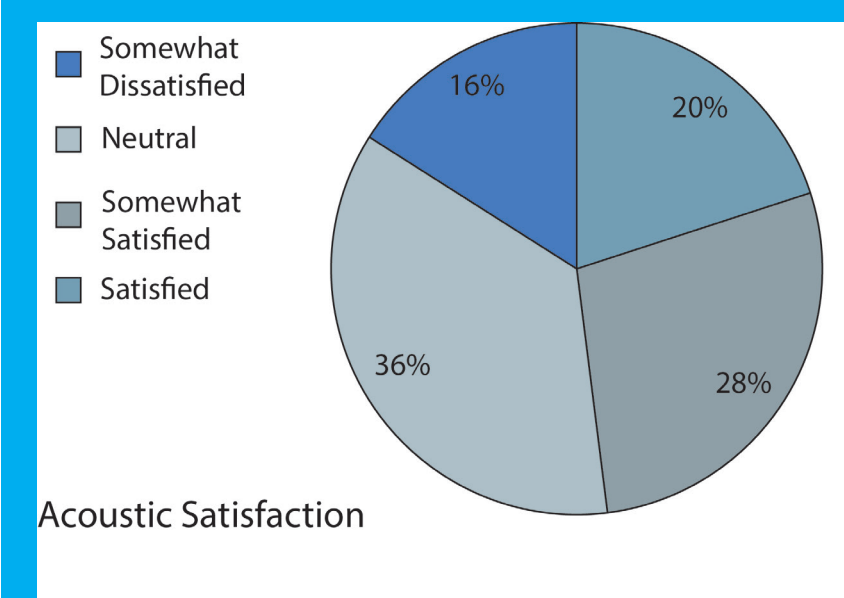
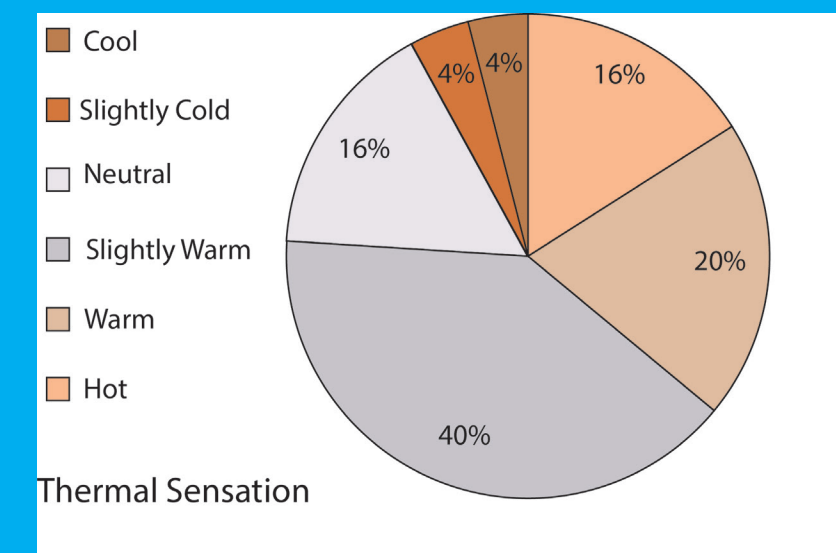
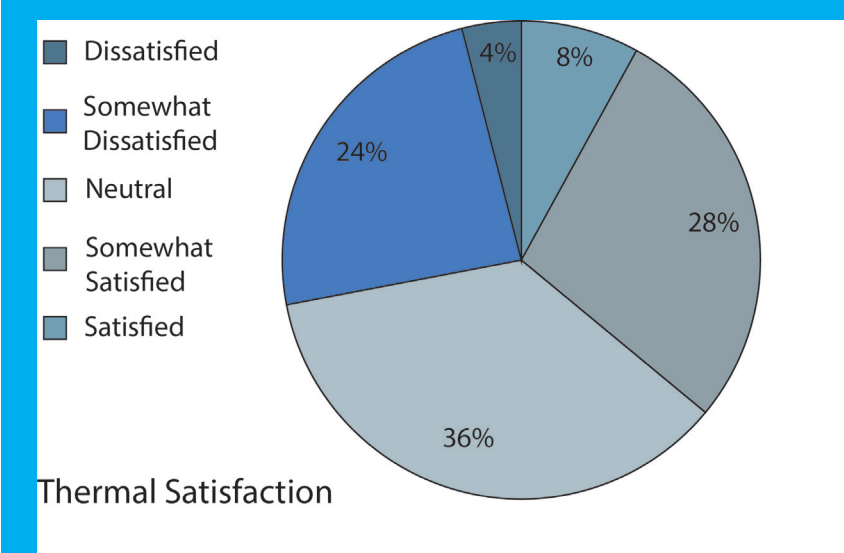
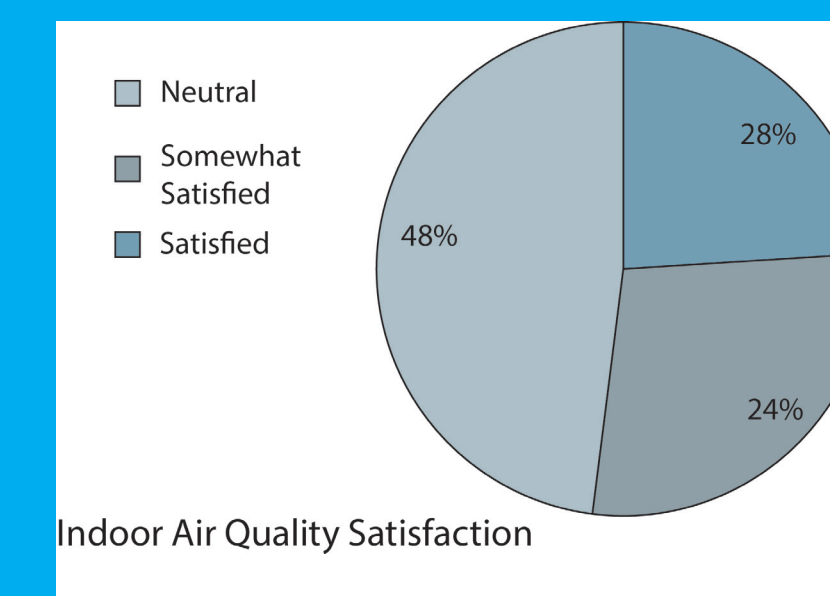
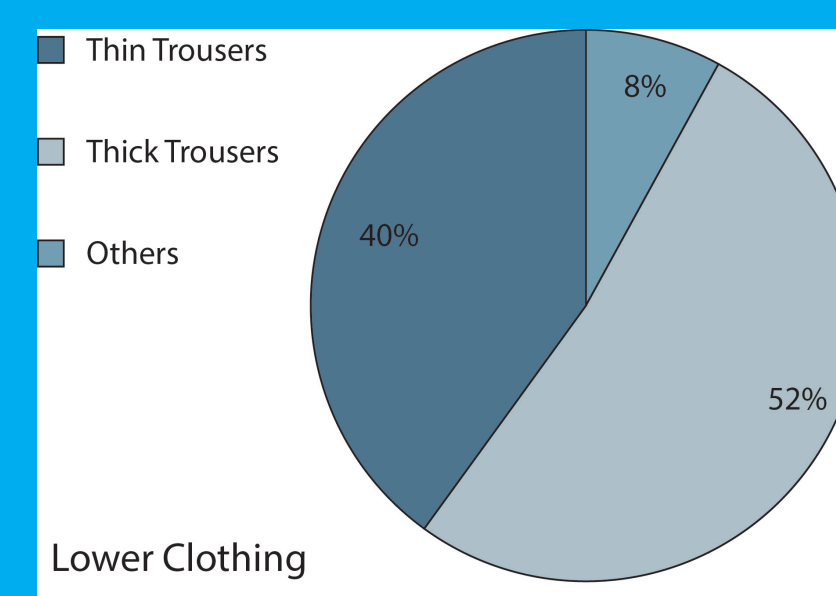
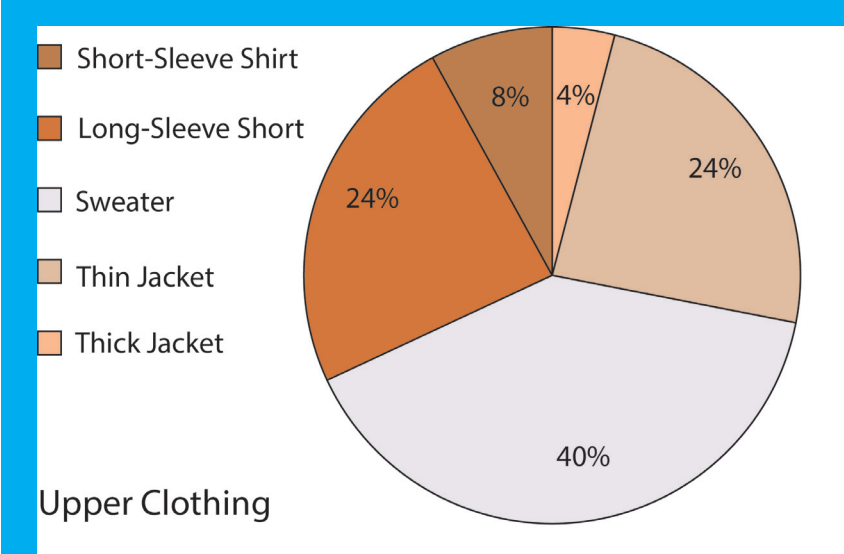


The relative humidity in the room fell below the ideal comfortable range for the entire time the room was analyzed (Jan 18 - Jan 21). In the beginning, on Sunday, January 18th, the relative humidity was around 25%-30%, but by the end of the recording, Tuesday, January 21st, the relative humidity fell to around 15%.



During the entire time recording the room's temperature, it fell within the range of comfortability. During the beginning of recording the temperature, Sunday January 18th, the room was about 74 degrees fahrenheit, and by the end, Tuesday, January 21st, the temperature was 70 degrees fahrenheit.

Survey data



Indicative
The space we decided to select was the fourth-floor architecture studios: room 419 and 420. The fourth-floor contains two bays of studio space with primary occupants being students and some professors occupying these spaces, while the number of occupants peak on Monday, Wednesday, and Friday between the hours of 1 PM to 5 PM. How well-designed are rooms 419 and 420 in the CAP building in terms of thermal comfort for occupants?

Investigative
Our hypothesis is we believe that rooms 419 and 420 are not designed optimally for the thermal comfort of occupants. The thermal comfort levels of the fourth-floor studios are within acceptable standards, while the relative humidity is slightly below the acceptable standard, but the occupants are not satisfied with the thermal comfort levels. The data that we took from the machines were collected beforehand, while the surveys were conducted a few days after, therefore the results may differ slightly. According to the benchmarks, the relative humidity of rooms 419 and 420 fall below the acceptance standard which is 30-60%, meaning that the rooms feel drier. The relative humidity gradually decreased between January 18 to January 21. The benchmarks for the room temperature are within acceptable standards which is between 68-76%. The temperature gradually decreased between January 18 and January 21.

Diagnostic:
The two methods of data collection used to conduct this research study was first a quantitative analysis of the temperature in rooms 419 and 420 through 1/16 - 1/21 using a HOB0 device. The second method of data collection conducted was a survey of the occupants of rooms 419 and 420 for five days between 1/24 - 1/28. The survey asked questions of clothing, type, activity engaged in, thermal sensation, and satisfaction levels with thermal comfort, lighting environment, acoustic environment, and indoor air quality.

Results:
According to the data collected by the HOB0, the temperature levels were in the comfort zone, but the data collected through the survey found that occupants of the fourth-floor studios felt slightly on the warmer side. This could be due to various reasons, such as varying times between the HOB0 data collection and the survey data collection, as well as the HOB0 data collection being conducted during the weekend for a portion of its data collection period when there would be less people in the space meaning less heating from people. Additionally between the HOB0 data collection and survey data collection periods the ventilation was set for colder weather while it was getting warmer outside making the indoor temperatures feel much warmer than necessary. This confirms our hypothesis that rooms 419 & 420 were not designed efficiently for the thermal comfortability of its occupants.

About 76% of people that took the survey said that it was slightly warm or hotter. This could be because of what type of clothing they wore and the amount they were moving. A good amount of people were sitting while being there, so that probably is not the reason for the high temperature sensation. Then that leads us to the clothing aspect. 92% of people wore long pants of some type. About a fourth of the participants were wearing a long-sleeve shirt, 40% wore a sweater, and 28% wore a jacket of some type. This leads us to one of two conclusions: either the studio space was cold or outside was cold. This research was conducted in early February when winter was still in full force. So in conclusion, they were wearing heavier clothing to combat the winter cold, not the studio space. It should also be stated that even though a good majority said that it was warmer, the satisfaction of the temperature was not all bad. 24% of people were either dissatisfied or somewhat dissatisfied. 36% said that they were neutral to the temperature. And finally, 36% were satisfied or somewhat satisfied. It surprisingly tilted more to being okay with it. Another important fact we need to consider is where in the building our research area was in. Our area was the fourth floor studio space. Since it was during the winter, the building had its heat on to combat the cold. We know that heat rises and the building has an open concept space allowing for air to move easily between floors.

Heat Prevention Actions

