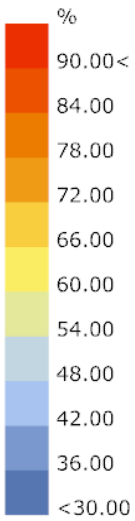
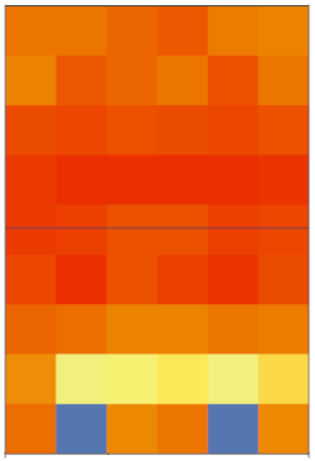
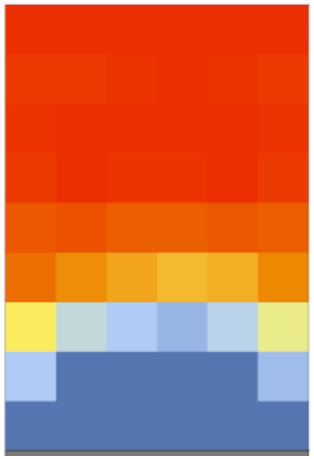
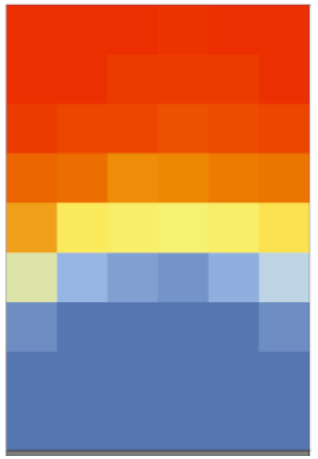
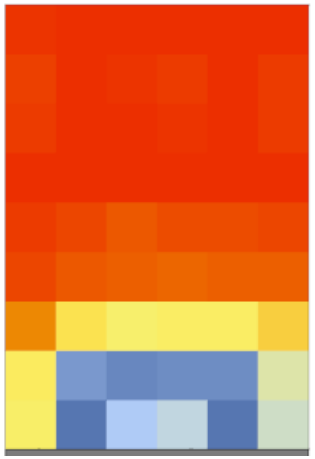
Window to Wall Ratio

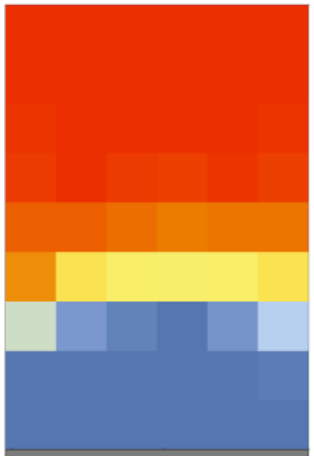


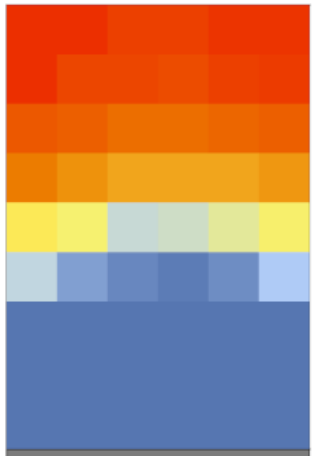

Window to Wall Ratio: 0.2

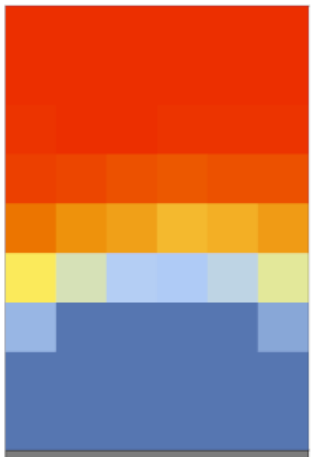

Window to Wall Ratio: 0.4

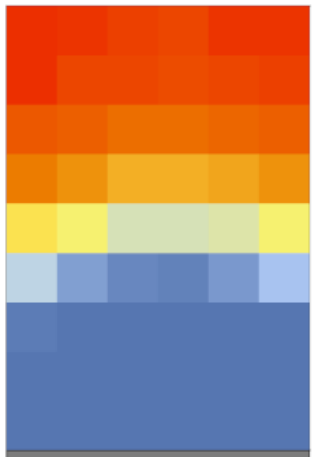

Window to Wall Ratio: 0.4


Window to Wall Ratio: 0.3


Window to Wall Ratio: 0.5

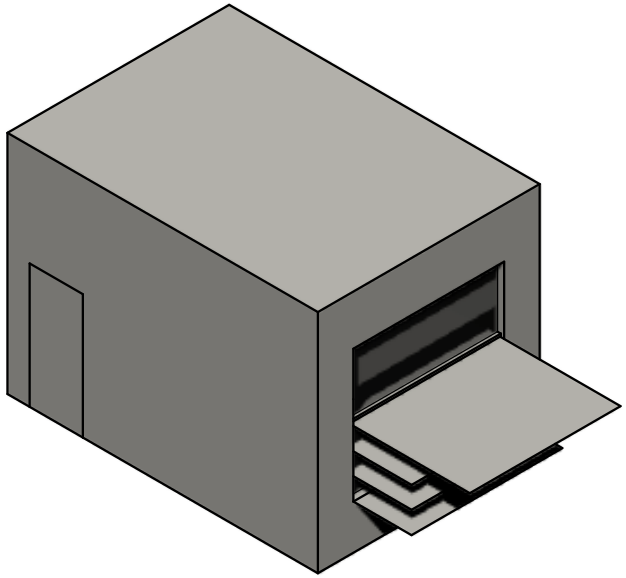

Window to Wall Ratio: 0.5

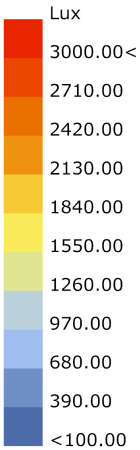

Window to Wall Ratio: 0.6

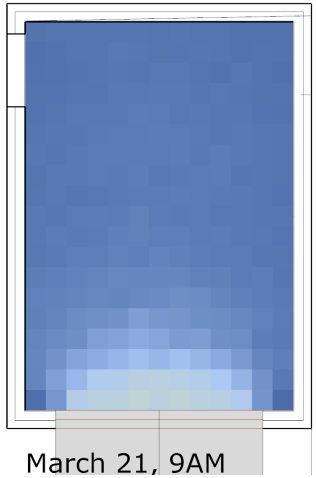

Window to Wall Ratio: 0.6

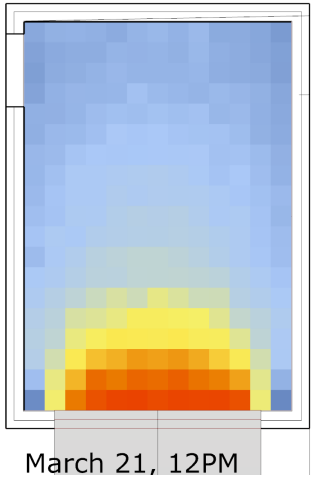
These image represent the annual UDI or Useful Daylight Illuminance with a changing window to wall ratio. This UDI is measuring illuminance between 100 and 2000 Lux as useful. The overall room dimensions are based off of the room I have studied all semester. Overall these show that the room achieves or exceeds the proper amount of illuminance. Really, the larger issue is the excess of Illuminance near the south window as it increases in size. With this in mind, one of the smaller window to wall ratios would propose the best opportunities.

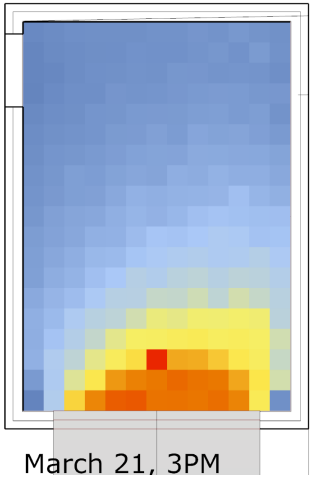
Proposed Strategy

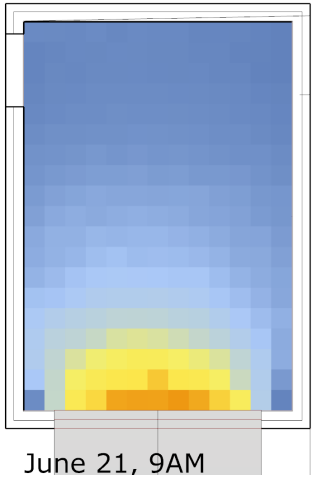


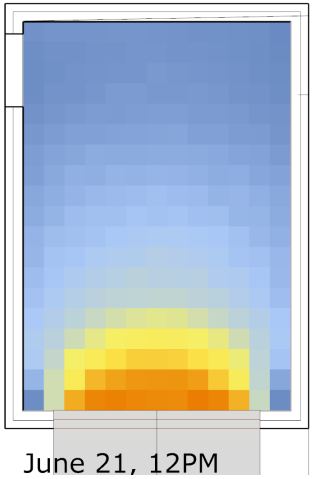


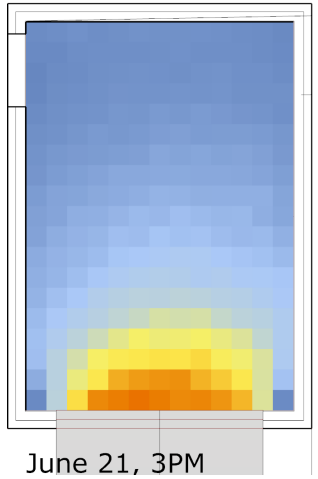

March 21, 9AM

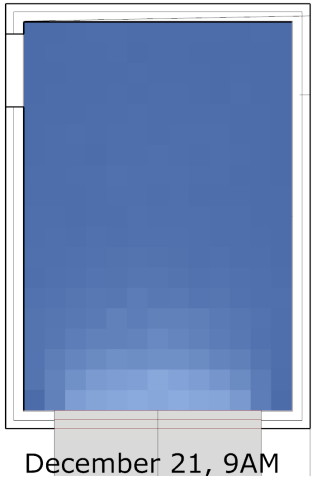

March 21, 12PM

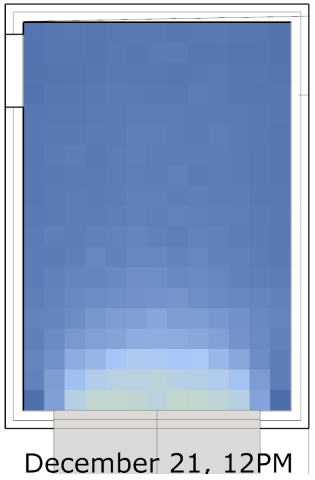

March 21, 3PM

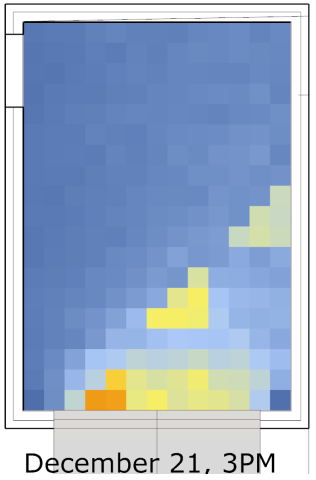

June 21, 9AM


June 21, 12PM


June 21, 3PM

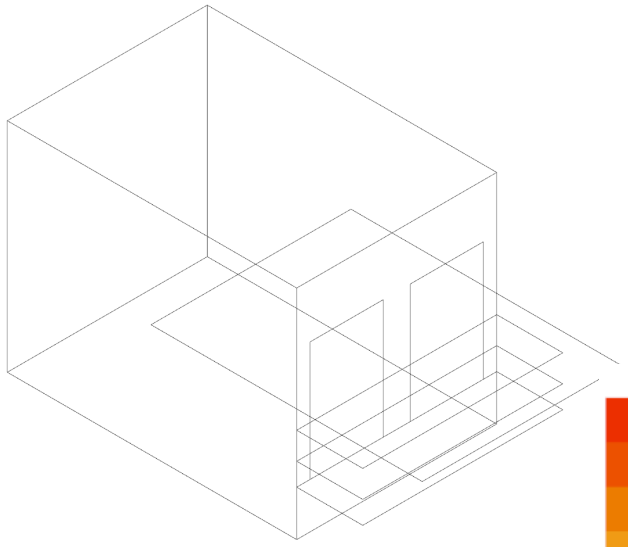

December 21, 9AM

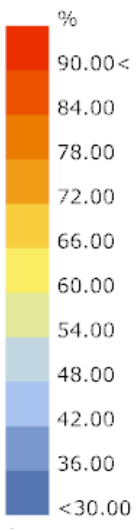

December 21, 12PM


December 21, 3PM

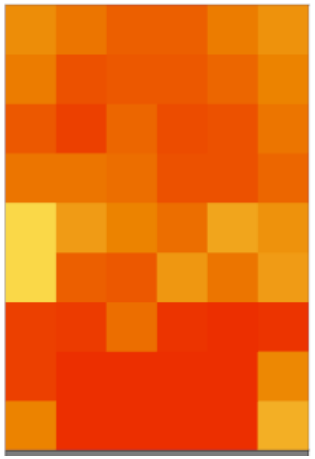
With knowledge gained through previous studies of illuminance it is known this room has issues with light reaching deep inside. The images to the right which were previously run demonstrate changes already made, Here the window to wall ratio is 50%. it is clear that there is excess light in the front of the room and that while the back get some it is generally on the lower side.

Window to Wall Ratio with Shading





Window to Wall Ratio: 0.4



Window to Wall Ratio: 0.2

Window to Wall Ratio: 0.4

Window to Wall Ratio: 0.4

Window to Wall Ratio: 0.3

Window to Wall Ratio: 0.5

Window to Wall Ratio: 0.5

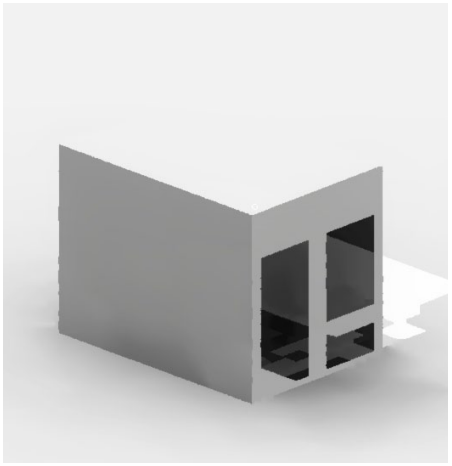
Window to Wall Ratio: 0.6

Window to Wall Ratio: 0.6

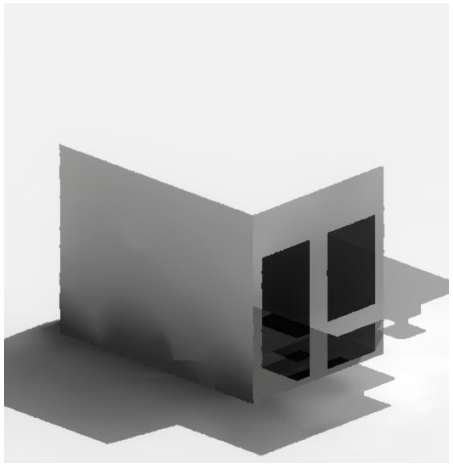
The shading devices already proposed are clearly helpful for keeping the illuminance within the range specified by UDI. Looking at the images to the right it is clear that a window to wall ratio of 40% provides a UDI which is ideal for the vast majority of the room for over 90% of the time. This along with the illuminance being generally over 300 Lux in the previous images suggests that this is a good solution

Exterior Daylight

These graphics demonstrate the changing light illuminance on the exterior south face of the room. These highlight the harsher more direct light during the later hours when the sun is lower in the sky.

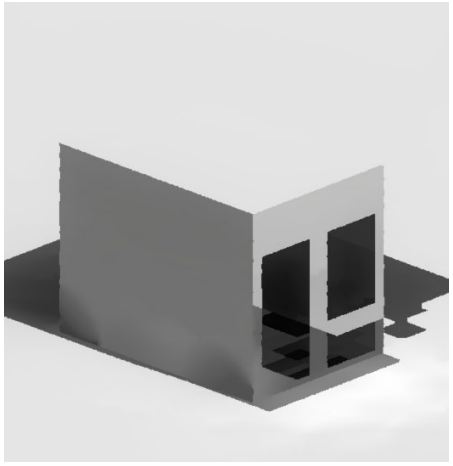


March 21, 9AM

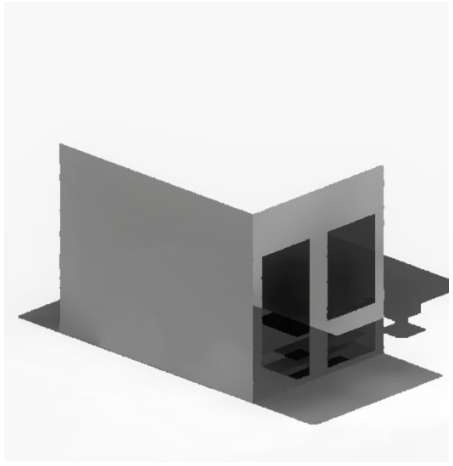


June 21, 9AM

Dec. 21, 9AM

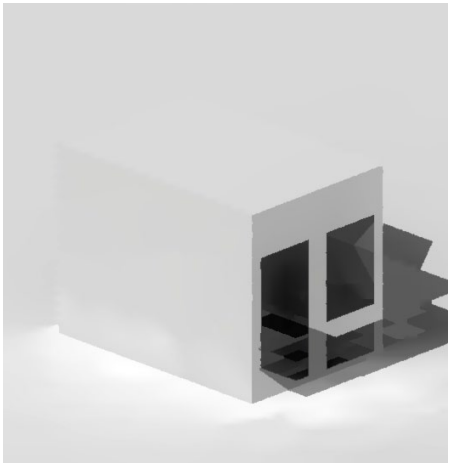


March 21, 12PM

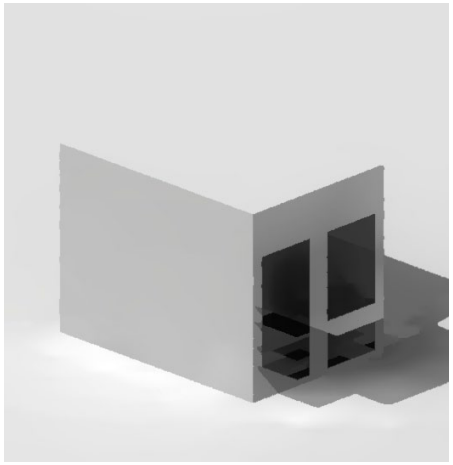


June 21, 12PM

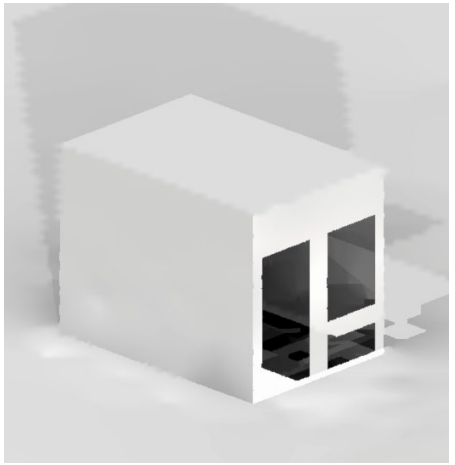
Dec. 21, 12PM



March 21, 3PM



June 21, 3PM



Dec. 21, 3PM

Glare Analysis

This shading design is further supported by the glare analysis. For the 9 times tested throughout the year 8 have no perceptible glare. The one time excluded from this positive outcome is noon at the winter solstice.

March 21, 9AM

June 21, 9AM

Dec. 21, 9AM

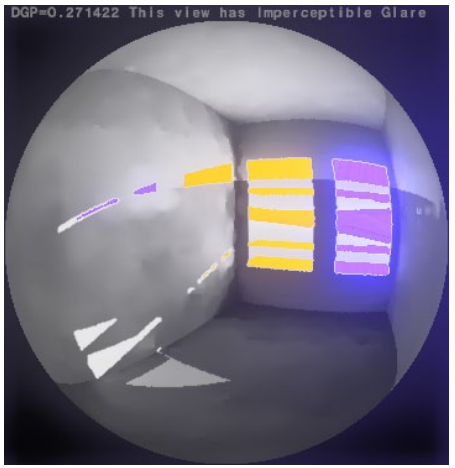
March 21, 12PM

June 21, 12PM

Dec. 21, 12PM

March 21, 3PM

June 21, 3PM



Dec. 21, 3PM