

Impact of a Green Roof on Student Study Space Preferences

Does Biophilic Design Matter?

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ACRL 2023

Introduction

When Charles Library at Temple University opened in September 2019 it featured one of the largest green roofs in the state of Pennsylvania. The green roof was designed strictly as a sustainability feature – to reduce urban water runoff. But could the green roof provide an unanticipated additional benefit? This poster shares research to determine if a green roof also provides biophilic benefits to students.

What is Biophilic Design?

Biophilic design integrates nature, primarily landscape and plant design, into architectural and urban development.

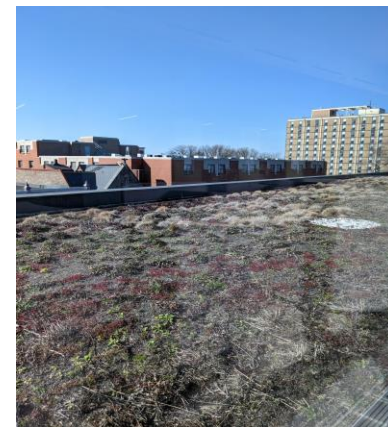


This view of the Charles Library green roof illustrates how a field of plants radically transforms what is otherwise a drab urban landscape

Pros/Cons of Biophilic Design

Pros:

- Improves health and wellness; hospital patients with views of nature settings had shorter stays, less negativity and took less pain medicine
- Shown to decrease stress of people who live in dense urban environments
- Increases utilization of spaces that might be otherwise unappealing
- Green roofs are environmentally friendly in urban settings
- Provides a natural animal habitat for birds and insects in urban spaces
- Improves air quality when green spaces (e.g., plant walls) are interior features of buildings



Green roofs are less attractive to view in cold climates but still offer the appeal of natural landscapes even on wintry days

Cons:

- Requires regular maintenance though green roofs require far less human intervention than indoor plant design
- May be difficult/costly to convert existing roof surfaces to green roof space
- In cold climates green roofs are barren during winter months
- Amount of green roof visibility depends on the structure; could be limited
- Green roofs take up considerable roof space; garden terraces are an option

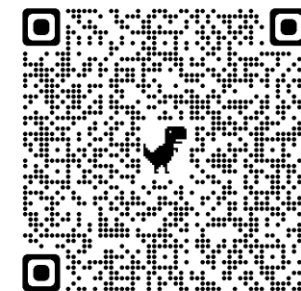
Research Questions

Charles Library has over 1400 study seats in multiple configuration to support both individual and group study, as well as 35 study rooms. While students fill nearly all of these spaces on any given day, casual observation points to heavier student traffic in study seats located in proximity to views of open space in general and the green roof specifically. Was this simply coincidence or was it possible that a biophilic design feature of the building was more attractive to students as a desirable study space.

To gain better insight in student study space preference, a survey instrument was designed to provide answers to this question"

Are students more attracted to those study spaces where there are direct views of the green roof?

This was also an opportunity to gain insights into the user study experience, so there were additional questions about preferred study space and what qualities and feature of that space were factors considered by students in choosing their study location.



Scan this QR Code to access the survey instrument.



Methodology

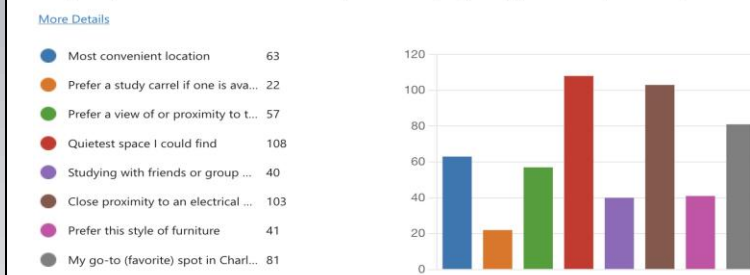
Over two weeks of the fall 2022 semester, the week prior to and the week of the exam period when the Library is at peak capacity, a paper copy of the survey instrument was distributed to students on the fourth floor of Charles Library. On days during that period, different areas of the fourth floor were targeted to gain a cross-section of seating spaces with different views of the green roof. Students were given a copy of the survey and asked to leave it on the floor if they wished to participate. Approximately 20 minutes later, the completed survey instruments were collected. The responses were then input into the online collection form. This phase of the survey resulted in the collection of 150 responses.

During the second and third weeks of February, surveys were distributed to study rooms around the fourth floor, but primarily to rooms with direct views of the green roof. Paper survey instruments were left in a box with a note asking students using the room to complete a survey. Completed surveys would be dropped in a second box in the study room. The survey was distributed in five rooms each day so that over the course of the survey period, each targeted study room was included several times. At the end of the two-week survey period, 35 additional responses were received. These new responses were added to the collection form. The researcher would know what fourth floor locations responses were coming from.

Results

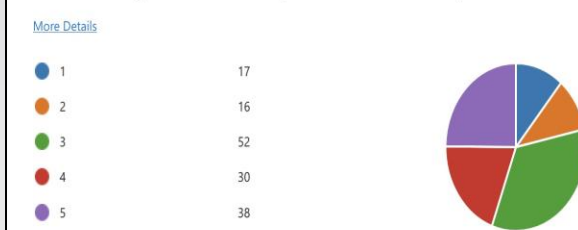
With a final sample size of N=209 what did the participant responses suggest about the relationship between the green roof and the choice of study space:

Why did you choose the location where you are studying today (check off up to three)?



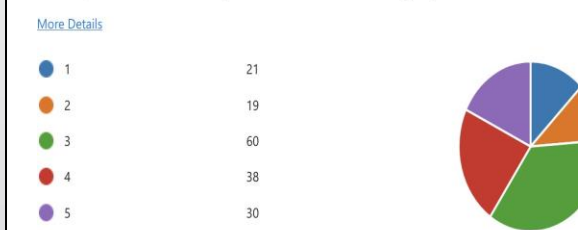
Quiet and access to an outlet were the top reasons for choice of space. View of the green space (green) was fifth most cited reason for choice of study space on the fourth floor of Charles Library

Indicate how important is proximity to or view of the Garden/Green Roof in choosing a study space in the Charles Library, where 1 is "most important" and 5 is "least important"?



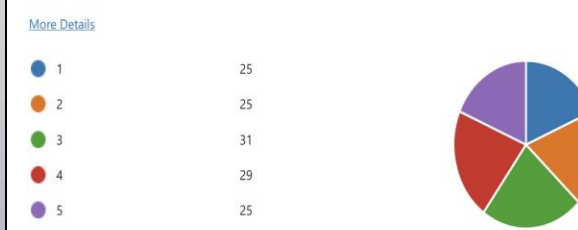
Proximity to a view of the green roof (green) was deemed less important than quiet or access to an outlet. But proximity to natural light was the most important after quiet and outlets.

How important is it to you for Charles Library to offer indoor/outdoor PLANTS or GARDENS on a scale of 1 to 5, where 1 is "not important at all" and 5 is "very important"?



While most respondents were neutral on the importance of plants and gardens to their library experience, more students indicated it was important to them than those who indicated it was not.

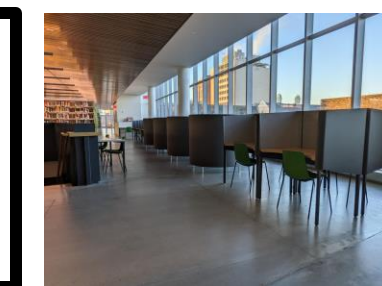
Indicate how important is a particular Style of Furniture (e.g. study carrel, seat at a table, etc.) in choosing a study space in the Charles Library, where 1 is "most important" and 5 is "least important"?



Proximity to a view of the green roof (green) was deemed less important than quiet or access to an outlet. But proximity to natural light was the most important after quiet and outlets.



Charles Library features a wide choice of study seating located in naturally lighted spaces. Only 4th floor study areas have green roof views.



Why did you choose the location where you are studying today (check off up to three)?



Filtering on just students who reported sitting in a study room (great roof view) - they state roof proximity is less important (green) to study space selection than non-study room respondents – but a majority (65%) do indicate that natural light and outdoor/natural views are important factors in choosing study space.

Conclusions

It is becoming more common for academic libraries to incorporate plants and even plant walls into their design owing to the research that supports the wellness benefits of biophilic design. A green roof is library plants on steroids – it is part of the fabric of the entire building. It envelops the building in greenery. On the fourth level of Charles Library - it is everywhere.

While the survey data is only partially supportive, it does suggest – and supports prior research - that the presence of a green roof can, for many students, be a building design feature that attracts them to a particular area of the building because it enhances their connection with the library space and contributes to their wellness.

Survey results do make clear that among the various building design elements that draw students to a particular study space, the top factors are

- Quiet
- Outlets (ask me about the use of alternate device power support at Charles)
- Privacy
- Natural light / Outdoor views

Based on the results alone it is challenging to interpret student preferences for the natural light and views on the Charles Library 4th floor. To what extent do students include the presence of the green roof into their responses?

Future Research into Biophilic Design in Academic Library Spaces

The survey results were somewhat inconclusive about the impact of the green roof versus natural light and outdoor views. There is more to learn about the link between plant life in and around libraries and how students respond to it. A next phase of this research project would make use of interviews with individual students, focusing on those who utilize the spaces that offer views of the green roof. There is more to learn about how a green roof impacts student study space preference and how biophilic design could be contributing to their overall wellness.



From the Students

- "The natural light is the best part"
- "I love the view from the 4th floor. I really think plants are a good idea because a lot of people prefer the window seats with a view of the outside."
- Upstairs [4th floor] is the best, the windows help with light and heat in the winter and that's comforting
- "Natural light and views really help me stay focused."
- "The view/big windows! I hate feeling cramped and stuffy when I'm studying, and the fourth floor never makes me feel that way."
- "It's a great, peaceful location. The vibes are nice and there is a lot of natural light."