

University of British Columbia

Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Executive summary: Biophilic elements of UBC campus buildings and student well-being

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Health and wellbeing, along with place and experience, comprise two of the eight components outlined in the UBC Green Building Action Plan (GBAP). Bearing these principles in mind, we conducted an exploratory study of student interaction with space in two buildings on the UBC campus. The objective of the study was to examine the effects of biophilic elements of these campus buildings on students' perception of well-being, as well as use of space.

Biophilia is defined as, "the inherent human inclination to affiliate with nature that even in the modern world continues to be critical to people's physical and mental health and wellbeing" (Kellert & Calabrese, 2015). It is important to note that both biophilic and biophobic responses are theorized to have developed in response to various physical (and mental), and adaptive advantages that also might be both ethno-culturally and individually specific (Ulrich, 1993). For the purposes of our study, we were especially interested in the biophilic impacts of wood, partly in recognition of its structural role and functions, its aesthetic qualities, and its consequent importance for the building planning units at UBC.

Notably, nature does not operate in a vacuum and biophilic elements and their consequent effects operate in concert with other biophilic elements. Using a mix of ambulatory interviews, expert interviews and observations, the study therefore focused on two building sites with an array of biophilic elements including wood, natural light, and greenery. These were the Forest Science building and the Center for Interactive Research on Sustainability (CIRS). The study was conducted in fall of 2022 as part of the RES 505, Qualitative Methods course (Instructor: L. Harris).

After conducting an in-depth literature review on our topic and prior to beginning our field-work, the research team met with representatives of the UBC Campus and Community Planning department to gain an understanding of their main concerns and priorities before confirming our own study focuses and building sites. Each of the three researchers then conducted observations in both the CIRS and Forestry buildings before jointly formulating interview questions.

We recruited a total of four students for ambulatory interviews and one faculty member/expert in the field of environmental psychology for a regular (seated) interview using convenience sampling. Interviews were administered separately, with each researcher conducting 1-2 interviews scheduled between forty-five minutes and an hour. Walking between buildings in ambulatory interviews allowed students to interact with multiple spaces, making comparisons between the Forestry and CIRS buildings, and other on-campus spaces. Given variances between researchers' levels of experience, three of the ambulatory interviews were conducted in a semi-structured fashion, while our expert interview and one ambulatory interview were conducted using structured interviews. After transcribing interviews, we then used inductive coding to code our data. Alongside an in-depth literature review, the expert interview proved helpful in informing our final analysis.

Based on the analysis, a series of thematic results and broad recommendations emerged in relation to student wellbeing:

1. Affinity for biophilic elements:

- Students described an appreciation for a variety of biophilic elements including greenery, sound, architectural shapes and designs reminiscent of the natural world, focusing on colour, natural light, and texture.
- Among other considerations, students articulated a strong preference for natural light and a dislike for gray coloured surfaces. Colour preferences were contextual, with some students generally preferring brighter colours and others preferring less overtly colourful environments. One interviewee with a preference for bright colours expressed that they were more receptive to sporadic use of gray within buildings so long as natural light was present. They also likened the experience to the gray Vancouver sky, highlighting some of the challenges that UBC students may generally face in the context of Vancouver winters. In terms of texture, unpainted gray concrete was highlighted as especially unpleasant.
- Most students directly expressed an affinity for wooden surfaces in building interiors, as well as a desire for more greenery. One student described a desire for more (indoor & outdoor) spaces allowing them to interact directly within green spaces, beyond simply viewing them through a window. While window views may potentially offer some biophilic benefits that could be explored, these were also noted as potentially distracting by some students. While times and site constraints in our study did not allow for an in-depth exploration of the effects of natural sounds on student wellbeing, one student did mention the relaxing effects of white-noise, and water specifically.

Lessons/ Recommendations:

The study provided strong support for the incorporation of biophilic elements, including greenery, architectural shapes and designs that mimic nature (such as the columns in the forestry science building and other curved wood features), natural lighting in campus buildings, etc. Inputs from student also suggested the need for further work and strategic planning regarding window placements, perhaps suggesting different needs depending on uses of various spaces. Of all the biophilic elements, natural light seemed to emerge as a priority for student wellbeing, especially given the challenges of months without much sunlight in Vancouver. By contrast, use of gray surfaces should perhaps be limited, notably gray concrete surfaces.

Given our small sample size, these results should only be taken as exploratory and indicative of potential themes of interest. Future studies might investigate the diverse array of individual, and especially ethno-cultural preferences of UBC students with regard to key considerations. This may be particularly important given the significant percentage of international students at UBC. In addition, and while our research did not focus in depth on natural sounds due to time constraints, much research attests to the biophilic properties of nature-based sounds from the sounds of birds to running water. Thus, the incorporation of auditory elements such as fountains in indoor study areas may prove beneficial if feasible (Fisher, 2021). While natural lighting was clearly preferred, students also expressed an appreciation for other warm types of lighting for certain uses of space, compared to harsh, fluorescent lights. These lighting preferences might be particularly relevant for nighttime, or where access to natural light is not attainable.

2. Building facades:

- *Artificial versus natural delineations:* Students generally indicated a strong affinity for natural features and outdoor environments and a strong dislike for elements that were perceived to disrupt such natural experiences, including consumer-targeted signs or advertisements that were perceived as similar to commercial bombardments. That said, students did appreciate the convenience of having stores close by, and so the design of buildings should balance these seemingly, though not necessarily, conflicting desires in planning student spaces.
- *Exterior Facades:* Despite widespread appreciation of biophilic element within selected sites, building exteriors emerged as an important factor that might dissuade students from entering spaces, especially in cases where exteriors were judged as 'bland' and 'uninviting' and when students had no experience of the building interior.

Lessons/ Recommendations:

It is unclear the extent to which there is a strong discouraging effect of outer building facades in cases where students did have previous experience of biophilic building interiors. Perhaps students would also have preferred building exteriors that forecasted the biophilic features offered within. Future studies could likely further evaluate diverse student preferences and/or purpose-specific goals in various spaces. However, several directions for UBC planning are clear:

There is a clear need to pay attention to both exterior and interior facades during building design, including better coordination of natural versus artificial delineations. Moreover, biophilic features are felt to be important aspects of building design for many spaces, making students feel calm, focused, and comfortable.

3. Other general principles for building design:

- *Multifunctionality & other adaptive advantages:* In general, students favored environments that allowed for multiple functions and possibilities. Examples include departmental layouts that allowed for both quiet study and potential social interaction, as well as buildings that offered multiple activities and were seen as dynamic. Some students also suggested they might like spaces whose very functions varied during different time periods.
- By contrast, students we spoke with disliked restrictive environments, such as dark, cramped, or similar spaces that felt to be 'inconvenient'. This is once again in line with the theory behind biophilia hypothesis insofar as biophilic tendencies are thought to have arisen from adaptive advantages. In a similar vein, interviewees preferred environments that provided them with a sense of psychological safety (e.g. balance between shelter and openness), community, familiarity (e.g. own departmental spaces), comfort and convenience. In most cases, these elements were also associated with greater senses of meaning and belonging.

- *Spatial purposes:* Students tended to gravitate to spaces according to the purposes they were seeking out, for instance, quiet spaces (such as cubicles) when emphasizing focused study time, or even certain types of relaxing. By contrast, students sought out livelier, more audibly, visually and/or physically dynamic spaces for other types of activities or activity goals (e.g. social interaction). Meanwhile, though interviewees appreciated spaces that emphasized comfort while relaxing, highlighting particular areas deemed not comfortable enough, they also noted that too much comfort might be distracting for focused studying contexts. Instead, arrangements that provided a “goldilocks level of comfort” were most preferred for studying, even as students maintained the need for variety depending on uses and timing.
- *Importance of meaning:* Several interviewees made connections to various elements that infused buildings with meaning. Having spaces dedicated to a sense of community was identified as particularly attractive for students and important in meaning making and psychological health (i.e., investing in notions of a collective). In the case of the forestry building, two of the four ambulatory interviewees highlighted Indigenous monuments and attributes as important for meaning, sense of context, and their overall sense of wellbeing. Various students mentioned a desire for more greenery even within the forestry building, with one suggesting that this would have been more fitting with the forestry theme. Two students also suggested that sustainability principles were important for their appreciation of the building sites, though it’s unclear whether these sentiments reflect more general core values of the UBC student community.
- In the case of the CIRS building, one participant described the lack of attention to multifunctionality and community, as well as the deficit of cultural-historical elements as seen in the forestry building. CIRS was thus described as “shell”-like in ways that detracted from meaning-making and wellbeing. Despite the student’s respect for the principles of sustainability that informed the CIRS design, this suggests that modernity without historical grounding can nonetheless contribute to an experience of detachment for students.
- In addition, one student suggested that it may be helpful for building layouts themselves to be designed around “core” or central values in order to confer greater spatial meaning and sense of belonging to students. For instance, the forestry building was identified as a space that might incorporate more greenery and place greater emphasis on public student spaces. In this sense, a more diverse sense of student values may also be valuable here in guiding policy.

Lessons/ Recommendations:

Where possible, UBC campus planning should prioritize multifunctional spaces. Whether there is wide variation in perceptions of a “goldilocks” level of appropriate functionality is yet to be explored. Future studies might attempt to understand this to better inform decision-making as it pertains to multifunctional spatial design.

Relevant to the former point, UBC may also want to incorporate a diversity of spaces in recognition of the fact that specific spaces and layouts provide varying impacts on student wellbeing according to individual differences and preferences.

Finally, developing a greater understanding of the diversity of student preferences, as well as deciphering which of these preferences comprise core or central values for students could be very helpful

for the UBC planning department as it strives to promote student health and wellbeing in connection with place and experience. Whatever the direction in this regard, it is clear that biophilic building elements do hold meaning and relevance for students and other users of buildings, and this theme should continue to be explored both in research and planning.

References Cited

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***Please contact the authors directly if you would like to view the full copy of the report. Note, however, that the class report was not finalized for publication and for sharing more generally. Email: gabby.fraser94@gmail.com**