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Exploring a Connection Between Learning and Student Perception of Place: A Pilot Study

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Lee Honors College

Thesis

March 15, 2019

Dedication

For my parents

Acknowledgements

I would like to pay special thankfulness and appreciation to the Western Michigan University Lee Honors College for proving me the opportunity to conduct undergraduate research and for giving so much support throughout this project. I am grateful for the overall experience as well as the preparation given for this academic challenge. Also, this project was inspired by my experiences in the Lee Honors College Study in the States course, 'Therapeutic Gardens of the Pacific Northwest,' so special regards to the College for providing such compelling opportunities. I would like to show my gratitude to my thesis chair, Dr. Amy Wagenfeld. As the instructor of the course, she inspired the idea behind this great body of work and then helped me in bringing it all together. Her assistance was critical in my success and for that I am more than grateful. More thanks go my other committee member Dr. Ben Atchison, for his support through this project. Last, I would like to thank my family and friends for their constant love and support of my work.

Abstract

The quality of the physical environment is understood to impact overall health, wellbeing, and capacity to learn and engage in daily life. This pilot study explores how students in the Speech Language and Hearing Sciences program at Western Michigan University view the effects of indoor and outdoor nature spaces at the College of Health and Human Services on the East Campus of Western Michigan University on their learning experience. Results of the study suggest that there are significant relationships between the participant's perception of interesting qualities in the College of Health and Human Services and feeling a sense of connection to their learning environment. The data also suggested that there is a significant relationship between student perception of their ability to focus in the College of Health and Human Services atrium and time spent there, as well perception that the CHHS is designed differently than other academic buildings.

Introduction

One's physical environment has a tremendous impact on health and wellbeing. According to the biophilia hypothesis, from an evolutionary perspective, humans have an innate tendency to affiliate with life and life-like processes. The affiliation includes plants, water, animals, mountains, and the likes. This tendency is where survival and reproduction are dependent on interactions with the natural environment (Wilson, 1984). Almost a decade later, Kellert and Wilson (1993) built on the biophilia hypothesis in their book, *the Biophilia Hypothesis*. Described as an innate love for the natural world that is universally felt by all people, biophilia is attributed in part to our genetic make-up and evolutionary history (Kellert, & Wilson, 1993). Research findings from varied disciplines has long supported this hypothesis as it has shown that humans tend to prefer green and natural over built landscapes and derive physical and

psychological benefits from exposure to these areas (Bratman, Hamilton, & Daily (2012). One may ask, are these same benefits be reaped through indoor nature experiences?

Review of the Literature

Nature and Health: Nature as Health

In his book, *Spirit and Place*, Day (2002) states, "If you've ever been somewhere that renewed energy, bathed you in calm, inspired you, you will know that places can actually be health-giving" (Day, 2002, pp. 47-49). Hundreds of studies show that medical centers purposely designed with natural elements provide patients, their families, and staff physiological and psychological benefits. (Gerlach-Spriggs, Kaufman, & Warner, 1998). This includes effects such as positive emotions, counteracting stress in treatment and recovery, and enhancing pain management (Ulrich 1984). In fact, simply having a view out a window has been correlated with health benefits in patients, such as earlier discharges, less need for pain medication, and reduced nursing intervention (Ulrich 1984; Van den Berg, 2005). In another study, the health benefits of having a room window view of natural surroundings were analyzed for 278 patients in a residential rehabilitation program (Raanaas, Patil, & Hertig, 2011). In this study, results of self-reported mental and physical health and emotional status described as "subjective well-being" found that women with an obstructed view of nature through their window reported negatively regarding their physical health (Raanaas et al., 2011, p. 21). Comparatively, men with an obstructed view out their window reported negative feelings about their mental health (Raanaas et. al, 2011). These benefits extend beyond healthcare facilities. Additional research findings have shown that including nature in the workplace can positively impact one's ability to progress through stressful situations and feel less of the psychological toll from that stress (Adevi, 2013).

Further to physiological and psychological benefits, it has reported that viewing images of nature improves sustained attention (Berto, 2005).

In addition to the aforementioned research supporting the physiological and psychological benefits associated with being in nature and natural landscapes, it also indirectly effects one's overall health and wellness. Studies have shown that those who reside near urban green spaces are encouraged to partake in more positive health behaviors like exercise (Lee, Ory, Yoon, & Forjuoh, 2013). The influence of a natural surrounding that provides for safety and an interesting environment could potentially lead to decrease in the sedentary lifestyle that many people maintain in today's society (Lee et al., 2013).

Stress Reduction

One of the psychological benefits of being in and experiencing nature spaces of interest looked at in contemporary research is stress reduction. Ulrich (1979) hypothesized that both passive interaction with nature strongly correlates with alleviation of stress. To test this hypothesis, Ulrich (1979) conducted a series of studies involving a group of mildly stressed participants instructed to view sets of color slides in which one group saw nature scenes and the other viewed city landscapes with little to no vegetation. Ulrich (1979) found that group members who viewed the natural landscapes had self-ratings of positive affect like affection and elation greater than the subjects who viewed the city landscapes. The participants who viewed the urban landscapes experienced an increase in perceptions of aggravation, anxiety, and feelings of sadness (Ulrich, 1979). Ulrich (1979) established similar results with college students whose stress was caused by preparing for and taking a final examination). Students who viewed natural scenes compared to those who viewed urban ones had elevated levels of positive affect and lower levels of anxiety and fear compared to the urban images.

Theory

The Attention Restoration Theory (ART), established by Rachel and Stephen Kaplan in the 1980's was constructed from their collective research. The ART focuses on the power of nature to replenish certain types of attention through unconscious, cognitive processes in response to natural landscapes (Kaplan & Kaplan, 1989). This theory, which is aligned with biophilia encompasses a comprehensive body of work validating human attraction to nature. According to the premise of the ART, for an environment to imbue the maximum benefit of attention restoration, it must contain four characteristics: compatibility, extent, being away, and fascination (Liprini & Coetzee 2017). However, an environment lacking all four characteristics can still provide attentional restoration, just not to the same level without having the benefit of all four characteristics (Lee et al., 2015).

Compatibility refers to desires of the person (in choosing activities to partake of) that can be fulfilled in the environment (Kaplan & Kaplan 1989). Compatibility requires that the activities the users desire to participate in fit with the activities that the environment can support.

Another characteristic of the ART is fascination: fascination refers to the existence of any interesting stimuli within an environment (Rennit & Maikov, 2015). Fascination can be divided in to soft and hard experiences. Any type of environmental stimulus must require only involuntary attention to be considered soft fascination. Involuntary attention is a concept first introduced by William James (1982), which refers to attention that requires no effort or intentions generated by outside events. Soft fascination can come from things in an environment

like plants and water or from differences in terrain or plants from surrounding places (Bratman, Hamilton, & Daily. 2012). Billboards, roadways, and other features in the built environment are examples of hard fascination. Highly stimulating processes like solving problems or a laser light show accompanied by loud music tend to be interesting, yet not restorative and calming. Instead, one might think of these experiences as hard fascination and requiring voluntary attention.

Two concepts associated with soft fascination are restorative and calming. These concepts enable users of the environment to involuntarily attend. Specific features in the landscapes, such as differences between surrounding places can be directly to fascination. An example of this is viewing or being in two spaces: one being built/urban and one being natural. The contrastive features of these two environments would tap directly into the characteristics of soft and hard fascination, with the likelihood of the natural space providing soft fascination and an urban scene or environment providing hard fascination . Natural landscape features provide more soft fascination than the built environment and tend to be more restorative and calming (Liprini & Coetzee 2017).

Being away refers to a difference in the environment that one may experience in their daily lives (Liprini & Coetzee 2017). This difference could be considered a break from participating in purposeful activities, an escape from unwanted surroundings, or withdrawal from everyday work/activities (Rennit & Maikov, 2015). Being away refers to any change in one's physical environment or a change in mental engagement from a particular task in order to experience a break from what led to the mental or physical fatigue (Thielen & Diller, 2012). This break could be characterized as the concept of being away.

Extent refers to an environment or setting that contains enough content for users to quietly and gently engage their mind for a period long enough to allow their attention to rest

(Rennit & Maikov, 2015). Extent is comprised of two factors; connectedness and scope. Connectedness refers to features of the environment that are interrelated and come together to generate a sense of coherence. This coherence, for example, could be the vegetation and trees that one is surrounded by in a forest. Scope refers to an environment that can call upon imagination by extending in space and time, so users of the space can recognize the possibility of spending time there. These two factors combine to create a feeling of being in a 'whole new world' (Liprini & Coetzee 2017, p. 157). Also, extent references common elements within an environment, so it can be perceived as a whole (Liprini & Coetzee 2017). In recent research, a scale has been introduced based upon the ART, and is widely used in research looking at the self-perception of restorative qualities of engaging with nature.

Assessment

The *Perceived Restoration Scale (PRS),* established by Rachel and Stephen Kaplan was constructed from their collective research from over 20 years and first introduced in 1996. The purpose of the scale was to give designers a tool useful in determining the impact of different settings on people (Ivarsson & Hagerhall, 2008). This scale is designed upon the four characteristics previously described: compatibility, extent, being away, and fascination. The scale has been adjusted and changed several times. However, the most clarified scale was created by Hartig et al. (1997) in which 26 items are used to describe the human-environment relations with the previously described four characteristics. These subscales are gauged on a 7-point scale where 1 is "not at all" and 7 is "absolutely adore it" (Haurua et al., 2012). In the present study, questions were designed around the four characteristics associated with attentional restoration and quantified by a 4-point scale with response options such as completely disagree, somewhat

agree, agree, and completely agree. An example of a question from the present study is," I think the CHHS has interesting qualities," which correlates to the characteristic of fascination.

Applying Theory to The Higher Education System

In academia, particularly on college and university campuses, much of the literature on interaction with nature concluded that students tend to spend their free time in green spaces near their classrooms (Speake, Edmondson, & Nawaz, 2013). Researchers have also studied the relationship between green space use and social interactions among university students. McFarland, Waliczek, and Zajicek (2008) investigated this association by studying the relationship between green space use and student self-perception of positive qualities of their life. The affective domain, quality of life, was measured "as a series of 30 statements encompassing three dimensions (total positive affective, interaction with students, and interaction with professors)" (McFarland, et al., 2008, p. 235). The cognitive quality of life was measured to the degree at which students felt their university was providing ample cognitive challenges. In order to measure this, the researchers presented 17 statements preceded with: "At Texas State University, I have been challenged to…" and included statements such as, "demonstrate how theories are useful in real life," "identify organizing principles in my courses," and "remember an extensive number of new concepts" (McFarland, et al., 2008, p. 235). It was found that higher green-user scores had statistically significant positive correlations with overall positive qualities of life in both the cognitive and affective domains as compared to those lower scoring green-users (McFarland et al., 2008). Noteworthy from the findings was that high green space use students had rated their "ability and challenge to apply knowledge learned in the university as higher when compared with low users of campus green spaces" (p. 234).

These positive qualities of life are also defined in other research as health, emotional, and financial domains (Vaez, Kristenson & Laflamme, 2004). The first study of this kind was a paper by Griffith (1994) in which the importance of green spaces on university campuses was established. A critical point from this paper was that the quality of university campuses dramatically increase when their design includes open spaces, and that the lack of these spaces diminishes overall perception of quality. The paper also explores how universities had begun to change and develop to, "produce visual harmony and order" through design of outdoor spaces (Griffith, 1994, p. 646). Recent literature supports this need for greened college campuses to support student and staff health and wellbeing (Gumprecht, 2007; Lawrence, 2012; Strange, 2003). This area of inquiry can be summed up by the statement;" open space provides emotional relief from the tightly compacted academic facilities and medical complexes now existing on large university campuses" (Griffith, 1994, p. 649). This 'emotional relief' directly correlates to the emotional quality of life. To tap into another defined quality of life, Griffith referenced financial wellness by explaining," a donor (of the university) is more likely to invest in an institution whose environment produces scenic pleasure," and goes further to explain that a "quality environment encourages more fundraising" (Griffith, 1994, p. 650). If one ascribes to the biophilia hypothesis, that humans are predisposed to affiliate with nature and that doing so is restorative, having opportunities to make these connections at all stages of life are health promoting and an important part of our humanity.

Student Life at the Western Michigan University College of Health and Human Services

It is undeniable that being a student in allied health and human services programs such as social work, nursing, occupational therapy, speech-language pathology, audiology, and physician's assistant has rapidly changed in the last 20 years. Technology has quickly taken a key

role in the everyday lives of all students and has reshaped the way college students learn. Due to technology's impact of the classic education system, we fall farther and farther away from the slower and patient pace of nature that has proven therapeutic and cognitive benefits (Atchley, Strayer, & Atchley, 2012).

As we work and study in these institutions of higher learning, it is important to consider whether their design, including natural elements, have any effect on learning. On the East Campus of Western Michigan University in Kalamazoo, Michigan, the College of Health and Human Services (CHHS) stands as one of several on-campus buildings with natural elements as a center of the design plan. Based on its design, the College was awarded Gold status from the Leadership in Energy and Environmental Design (LEED) rating system. The interior and exterior features of the CHHS include elements that correspond to compatibility, extent, being away, and fascination. The building opens into a large atrium with soaring ceilings, a vast network of lush indoor vegetation indoors, a sizable water feature and massive windows that span the entire east (back of the building) wall that open onto an open space with mature trees, grass, and walking paths. There are flexible options for seating and both quiet and group work spaces. These elements coalesce into a setting that was ideal for this study. The indoor and outdoor landscapes were designed to positively influence the human experience. This work examines the attitudes and feelings of Western Michigan University students who study within the CHHS with regard to how much, and if centering the architectural design plan around nature imparts positive tangible effects on their learning experiences. By asking the research question, "what impact does on campus indoor and outdoor natural elements have on students' in a speech and language pathology program learning experience," this study seeks to add to the existing knowledge base

equating access to nature with health and wellbeing for college students. The Western Michigan University Human Subjects Institutional Review Board approved this study.

Method

Design and Instrument

The key variables in this study were measured by a self-designed 11-question electronic survey. The initial portion of the survey included demographic information such as gender, age, and area of study within the speech, language, and hearing science program (speech language pathology or audiology). Questions also asked how many hours on average each participant spends at the CHHS per week during the semester and where they typically spend their time in the CHHS. Participants responded to these questions by choosing from several multiple-choice options. The remainder of this survey consisted of Likert scale type questions based upon the principles of the ART with regard to the CHHS. The four 'restorative' components assessed in this section of the survey aligned with fascination, being away, extent, and connectedness (Kaplan & Kaplan 1989). Please see Table 1.

Table 1. Questionnaire: Exploring a Connection between Learning and Student Perception of Place

1. Gender:

   Male Female Other

2. Age:

   18-22 23-27 28-32 33-37 37+

3. Program:

   Audiology Speech-Language Pathology

4. On average, how many hours do you typically spend in the College of Health and Human Services (CHHS) per week during the semester?

   0-7 8-15 15-20 20+

5. Where do you most frequently study in the CHHS?

   Classroom Atrium Computer lab SRC Other I do not study at CHHS

6. I think the CHHS has interesting qualities

   Completely disagree Somewhat Agree Agree Completely Agree

7. The CHHS is designed differently from other buildings I have studied/had classes in

   Completely disagree Somewhat Agree Agree Completely Agree

8. The CHHS has things I am familiar with

   Completely disagree Somewhat Agree Agree Completely Agree

9. I feel a sense of connection to the CHHS

   Completely disagree Somewhat Agree Agree Completely Agree

10. When I am in the CHHS atrium I feel focused

    Completely disagree Somewhat Agree Agree Completely Agree

11. I feel connected to nature while in the CHHS

    Completely disagree Somewhat Agree Agree Completely Agree

Participants

Participants were 20 females enrolled in a class of 27 students (including the author of this study, who did not participate in the study) who may (or not) study at the CHHS. Individuals were between the ages of 18 and 27 years and members of the graduating class of 2019 in the program of speech, language, and hearing sciences at Western Michigan University. While the study is representative of the students in the 2019 speech, language, and hearing sciences cohort, it is a convenience sample of the entire population of students at the CHHS.

Procedure

A link to the survey was made available through the Western Michigan University's 2019 cohort in the speech, language, and hearing science program's Facebook page with permission granted from the department chair. Researchers introduced the survey to all members of the sample at the end of a Special Studies in Speech Pathology class meeting at the CHHS with permission from the professor. Each participant, through the link that researchers posted on Facebook completed an informed consent form and then took the survey online via Survey Monkey.

Results

Quantitative Findings

The aim of this study was to examine the relationship between how students perceive their educational environment, and how that relates to their feelings of connection to nature.

Correlations

A significant relationship ($p < .004$) between where participants reported spending the most time in the CHHS building, and their perception of their ability to feel focused in the atrium was noted. From this relationship we infer that students who spend more time in the CHHS atrium obtain greater benefit from the surroundings and are able to feel more focused on their studies

and other activities. Another relationship noted between the variables of feeling focused in the atrium and acknowledgment that the CHHS is designed differently than other buildings in which the participants have taken courses, studied in, and so forth, was significant ($p < .042$). This relationship suggests a connection between ability to focus with greater ease when in buildings that are noticeably different in their design elements than others, in this case, the high biophilic nature of the building. We also found significant relationships between believing the CHHS has interesting qualities and having a sense of connection ($p < .037$) to it. This relationship suggests that students who perceive their surroundings and academic environment as containing interesting qualities, whatever they may be, leads to a sense of connection to that space. Please see Table 2.

Table 2.

Spearman's rho correlations of WH, WS CHHS, IQ, DD, Familiar., SOC, FIA, and Con. WN

	WH	WS CHHS	IQ	DD	Familiar.	SOC	FIA	Con. WN
WH	1.00	-.205	-.135	.044	-.247	-.158	.044	.086
WS CHHS	-.205	1.00	.319	.244	.322	.409	**.614****	.109
IQ	-.135	.319	1.00	.369	.045	**.474***	.435	.271
DD	.044	.244	.369	1.00	.301	.236	**.458***	.246
Familiar.	-.247	.322	.045	.301	1.00	.434	.326	.070
SOC	-.158	.409	**.474***	.236	.434	1.00	.418	.369
FIA	.044	**.614****	.435	**.458***	.326	.418	1.00	.291
Con. WN	.086	.109	.271	.246	.768	.369	.291	1.00

**. Correlation is significant at the 0.01 level (2-tailed), *, Correlation is significant at the 0.05 level (2-tailed).

Abbreviations: WH= weekly hours at CHHS; WS CHHS= where do you study in the CHHS; IQ= interesting qualities; DD= designed differently; FIA= familiarity; SOC= sense of connection; FIA= feel focused in atrium; Con. WN= connected with nature in the CHHC

Discussion

Limitations

Although, the sample population contained several potential male students, our findings lack data from them. All the findings in this study are based upon female respondents. Accordingly, increased generalizability and knowledge could have been gained from analyzing data from males. Further, the sample was small, limiting the findings. This sample was taken of convenience and only contains second year members of the Western Michigan University speech, language, and hearings sciences program, rather than all students enrolled in programs housed in the CHHS, as well as faculty and staff.

A further limitation is that the self-designed survey relied on self-reporting. Including biometrics such as measuring heart rate or cortisol levels while studying in the CHHS might provide additional data points regarding the value of studying in a verdant indoor space or others within the CHHS.

Future Research

In further work, a broader sample of all students and faculty/staff at the CHHS could add to the findings from this study. The other fields of study and programs within this college: occupational therapy, physician's assistant, physical therapy, nursing, and many others, could provide a more diverse population in which increased data could be collected. Adding a biometric component to the study might also strengthen the findings.

Implications for Educational Facilities

It is suggested that environmental factors impact many aspects of academia as well as physiological, and mental health. This study supports the existing body of literature on nature's impact on supporting student health and wellness. Results suggested that students perceive their surroundings and are affected in multitude ways. Specifically, and in alignment with work and conclusions drawn from past studies and literature, this data suggested that students feel a positive sense of connection to nature when in the CHHS atrium, a meeting place with large windows and views of outdoor scenery. In turn, this connection with a space that provides many of the elements associated with a restorative environment may positively impact their learning experience. Further study will support or refute these findings and can serve as a basis for design guidelines for academic buildings.

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