

A mixed Method Study into Impact Biophilic Design Has On First Year University Undergraduates

Introduction

The primary objective of this study will be to investigate the level of academic engagement students illustrate through the introduction and removal of biophilic design within a university teaching environment. The study shall be examined using a comprehensive review and combination of peer-reviewed academic literature and related past studies on the subject area that is biophilia thus allowing the opportunity to adapt and build upon previous findings produced from related studies by other researchers. With this being said, a particular focus on associated theories towards biophilia such as Attention Restoration Theory in which Tavis (2016) describes the brain to shift to a less stressful mode of processing shall be considered to provide the study with a well informed and supported framework to base any conclusions on that arise from the study results.

As explained by Wilson (1984), the evolution of humanity had once seen the population living amongst natural environments and spaces thus creating an innate need for all things green and living. This term has been coined by Wilson as 'Biophilia'. It is through biophilia that Hardman (2020, p.6) notes that we humans will naturally gravitate towards walks in the park, day trips to the zoo, spending money on homes situated around water and green areas and also dreaming of animals and other strange and natural life forms even though we are unaware of it. Studies have provided evidence that implementing these elements to everyday life can positively impact one's mental health and wellbeing whilst also allowing the opportunity 'to increase life satisfaction and improve attention restoration and stress recovery' (Chia-Chen et al, 2020, p.2). In response to various studies, many businesses and organisations are now introducing biophilic design to the workplace, thus 'bringing nature closer to the urban environment, evoking the double essence of the human being: social and natural' as defined by Sanchez et al (2018, p. 317) in reference to Brioni (2017). Sanchez *et al* (2018) also note that workplaces incorporating nature provide an opportunity for calmer adjustments, longer duration of concentration and enhanced productivity to name but a few with Tavis (2016, p. 11) stating that the use of biophilic design should be viewed as another set of human

resources tools to support positive outcomes in the workplace. Although in many UK universities the use of biophilic design has not been implemented as of yet, Abdelaal *et al* (2018) explain that by introducing the essence of the outdoors to the learning environment, not only will the ecological impact and operational efficiency of the campus largely improve but it will allow for the potential of creativity, productivity and all round wellbeing of the students to flourish 'Incorporating elements of biophilic design in learning spaces can positively support university students, creating environments that are stress reducing, and enhance creativity and cognitive development' (Peters, et al, 2020, p. 2).

As it is evident that biophilic design not only improves the individual's mental health and wellbeing but also the ability to exceed in the work place, I believe that the indication in which the learning environment can also be benefitted is something worth exploring. As explained by Wammes et al (2019), many university students often fall into a case of mind wandering during lectures, thus giving potential to poor learning. Al-Furaih *et al* (2021) also notes that students can often be seen as too engaged with their phones due to the phenomena of 'Fomo' described as 'Fear Of Missing Out'. With this being said, I believe that the proposed study could allow for a clear justification as to the potential benefits a biophilic design can have towards current and future university students and perhaps the whole of the educational system as well.

Methodological Approach

As part of the proposed study, it is intended that the research will be predominantly mixed method using both qualitative and quantitative methods in order to gain thorough and comprehensive findings from the study phenomenon. As mentioned by Gray (2014) in reference to Greene et al (1989), the use of multiple methods will allow for results to converge and authenticate one another thus adding a stronger validity to the findings. It is also noted by Cohen et al (2018), that mixed method research understands the fact that there is a concern for both numbers and a philosophical base of research thus giving possibility to the findings that may not be achievable by using only qualitative or quantitative methods.

On the subject of the research approach, the intended method in regards to collecting data shall be performed over the course of two pre-planned classroom based lectures for first year Outdoor Adventure Education students. The first lecture will look at student engagement towards academic learning within a normal classroom environment in which students will be asked to fill in the Perceived Restorativeness Scale (PRS) both pre and post lecture. As described by Hartig et al (1997) the PRS is designed to measure the extent to which particular environments hold restorative qualities. Based on the Attention Restoration Theory, this scale consists of seven elements including being away, fascination, preference, compatibility, coherence, scope and familiarity. As well as the PRS scale, I shall also look to conduct structured interviews with class members. These interviews shall be conducted both prior and post lecture in order to gain a greater understanding of participant feelings towards in class lectures. As it is evident that conducting interviews with each and every member of the class will be seen as a time consuming task, it is intended that by using a randomized sample selection, I shall only speak with a small number of class members. Members to be selected shall either be chosen by the class lecturer or by voluntary selection in order to avoid the risk of a potential bias within the findings. The second part of the research approach shall see the same class attending the same lecture a week later. This will allow for greater validity within the data collection process as these lectures will be taking place in the same room, on the same weekday at the same time, this in other words is described as the mediator variable. As mentioned by Cohen *et al* (2018) it is the mediator variable that has the ability to affect the strength and/or direction of both the dependent and independent variables within the study, thus being the reason in which I have chosen to replicate this variable in the same way for both parts of the research approach. In regards to the second part of the study, exact procedures as the first part shall be taken place with both the PRS scale and structured interviews carried out as per the previous week. The independent variable that is the room itself shall be modified to represent that of a biophilic design, this will include images of the outdoors, a variety of plants placed around the room (both living and artificial), an audio of nature sounds and the use of natural sunlight and airflow provided through the classroom windows. The intentions of this modification is to witness a change in the engagement, stress and productivity from the previous weeks lecture, predominantly this should be a positive change.

In regards to the advantages and disadvantages of this study, I believe that by using the same class, lecture slot and classroom throughout will give the study an opportunity to steer away from any data variation thus avoiding a disruption within the validity of the findings. Although this study will look to present the immediate response to a short term immersion within biophilic design in the learning environment, it is evident that the main disadvantage of this study will be that I will be unable to look at the long term effects this design can have on students. However, through the conclusions that arise from this study, an indication could be made as to the inherent benefits this immersion can give us thus providing a potential justification for the opportunity to perform this study on a larger sample size for a longer duration.

Planned Data Analysis and Presentation

As the PRS scale predominantly uses a likert scale to collect data, it will allow for the understanding of the samples opinions and attitudes towards the studies phenomenon. As explained by Cohen et al (2018, p.480) the use of this type of scale combines a sense of sensitivity to the findings whilst also collecting numbers. From there, analysis shall be taken place on SPSS in which I will be able to extract the data to show a clear set of findings through the use of cross tabulation thus allowing me to identify similarities between this data (primary data) and the assortment of sources collected from academic literature, journals, online data and surveys (secondary data). The use of confirmatory factor analysis shall be used to test the data with underlining theories supporting the study itself ‘confirmatory factor analysis is more stringent, testing a found set of factors against a hypothesized model of groupings and relationships’ (Cohen *et al*, 2018, p.818). Conducted interviews with participants shall be transcribed in full, from here I will then look to identify any potential themes that relate to both the collected secondary data and the findings that appear from the PRS data through the use of thematic analysis ‘a method for identifying, analyzing, organizing, describing, and reporting themes found within a data set’ (Braun et al, 2006). By choosing to analyse these two sets of data in the proposed way, I believe that the findings will influence each other allowing for an authentic presentation and the opportunity for further research within the study phenomenon.

In regards to the presentation of the findings and interpretations of the study, the qualitative data shall be presented first with the quantitative data to follow. By using this exploratory design, I believe the qualitative data will be able to tie in with the secondary data collected to give the reader an opportunity to further understand the study objective. By then introducing the quantitative data it will solidify the results by adding a sense of reliability to the study.

Research Planning and Ethics

In regards to the planning, organisation, logistics and ethics for the proposed study, it is important to consider the study duration time, financial logistics and participants involved within the study. Firstly, the time taken to collect secondary data should be prioritised, as I believe it is important that the study phenomenon is well solidified with plenty of evidence to show the research objective is achievable. This in turn should then be followed by the structure design of the interviews to be taken place with the study sample. On the approval and continuous communication with Outdoor Adventure Education staff, the study will be organised to fit in with a pre planned first year lecture, the factors that are out of the researchers control will be the date and time of this lecture. The time taken to conduct interviews should take no longer than ten to fifteen minutes, it is important that interviews are pre planned in order to tie in with participant calendar's and diary's. This subsequently will mean that these times will be labelled as factors out of the researchers control. Timing for surveys to be completed shall also need to be considered as it is of the best interest to not include this action during university lecture time, thus meaning that a further five to ten minutes will be needed both pre and post lecture to complete. Analysis and interpretation of results should be given a certain priority as it is important that nothing is missed whilst also providing a valid conclusion.

Resources needed for this study will need to be highly considered. As it is of the best interest to collect the most authentic and true data possible, the biophilic resources must be well thought through and purchased in the most ethical and eco friendly way possible. This could perhaps happen through the collaboration with the university as the potential benefits could be seen as worthwhile for both parties. Ethical considerations must be taken into account. Through the use of communication with university staff via email or direct face-to-face meetings, confirmation to conduct the

study with first year students should be achievable. As students are over the age of 18 the researcher will be able to avoid any trouble of falling into the under age category thus avoiding the need for parent or guardian consent. Communication with university staff shall allow the researcher to then find out if any participants within the sample fall into the vulnerable category. As the study objective needs participants to be unaware of the proposed phenomena objectives, communication with the research supervisor shall be needed in order come up with a solution to ethically approve the use of deception to sample members. This may take the form of informing students after the study takes place, however, it should be considered that there could be a possibility of participants feeling negatively after being informed.

Word Count - 2162

References

Abdelaal, M., Soebarto, M. (2018) 'History Matters: The Origins of Biophilic Design of Innovative Learning Spaces in Traditional Architecture', *International Journal of Architectural Research*, 12(3), pp. 108.

Al-Furaih, S., Al-Awidi, H. (2021) 'Fear of Missing Out (FOMO) Among Undergraduate Students in Relation to Attention Distraction and Learning Disengagement in Lectures'. *Education and Information Technologies*, 26 (2), pp.2355-2373

Braun, V., Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101. doi:10.1191/1478088706qp063oa

Brioni, M., 2017. Biofilia: La Montaña Viene a la Oficina. *Distrito Oficina*, 2, pp.16-19.

Chia-chen, C., Cheng Gwyneth, J.Y., Nghiem Thi, P.L., Song, X.P., Oh Rachel, R.Y., Richards, D.R. & Roman, C.L. (2020) 'Social Media, Nature, and Life Satisfaction: Global Evidence of the Biophilia Hypothesis', *Scientific Reports (Nature Publisher Group)*, 10, (1),

Cohen, L., Manion, L., Morrison, K. (2018) '*Research Methods in Education*' Oxon: Routledge.

Gray, D. (2014) '*Doing Research in the Real World*' London: SAGE Publications Ltd.

Hardman, I. (2020) 'The Natural Health Service'. London: Atlantic Books.

Peters, T., D'Penna, K. (2020) 'Biophilic Design for Restorative University Learning Environments: A Critical Review of Literature and Design Recommendations'. *Sustainability*, 12(17), pp.7064.

Sanchez, A., Ikaga, J., Sanchez, S. (2018) 'Quantitative Improvement in Workplace Performance Through Biophilic Design: A Pilot Experiment Case Study'. *Energy and Buildings*, 177, pp. 316-328.

Tavis, A. (2016) 'The Science Behind Happy Spaces' People & Strategy: *Journal of the Human Resource Planning Society*, 39(2), p.8.

Wammes, J. *et al.*, (2019) 'Disengagement during lectures: Media multitasking and mind wandering in university classrooms'. *Computers and Education*, 132, pp. 76-89.

Wilson, E. (1984) '*Biophilia*'. Cambridge, MA: Harvard University Press.