The Impact of a Living Greenwall on Student Attitudes, Moods, and Academic Performance

Brittany Rootes and Alison Miotke (Authors), Terry Ferriss, Travis Tubré, & David Trechter (Faculty Mentors)

Introduction

Research from multiple disciplines suggests that the physical environment in which an individual lives and works can impact their lifestyle, health, subjective well-being, and productivity. Studies conducted in office and academic settings in such diverse locations as Japan (Shibata & Suzuki, 2004), the United Kingdom (Knight & Haslam, 2010), and the Netherlands (Nieuwenhuis, Knight, Postmes, & Haslam, 2014) have consistently demonstrated that indoor plants can positively impact student and worker moods, attitudes toward work, and even productivity.

The goal of our research was to extend on this previous research by studying whether these same benefits would be seen for a Greenwall (i.e., a vertically arranged, living wall of plants) that is actually built into the physical environment of a classroom.

Objectives:

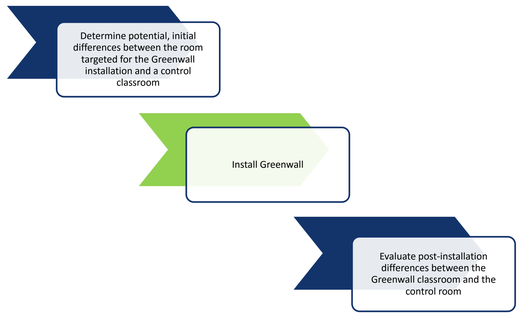
- To study student well-being, engagement, and academic performance in a classroom whose physical space has been altered by the addition of a Greenwall compared to a control setting.
- To examine whether these benefits are ongoing and might increase with longer-term exposure to such conditions.

Before Installation of the Greenwall

During the Installation Process

After Completion

Method



Experimental Process:

1. We first assessed initial equivalence of the room targeted for the Greenwall installation and a control classroom on key study variables including environmental perceptions and indicators of mood.
2. We ran a series of experimental sessions, where student participants (N=92) completed survey measures after being randomly assigned to either the target room for the Greenwall or an adjacent, control classroom. All pre-existing differences were either non-significant or favored the control room.
3. Following the installation of the wall, we repeated the process, examining differences between the Greenwall-enhanced room and the control room (N=79).

Dependent Measures:

Environmental Perceptions (Nieuwenhuis et al., 2014)

- Work-Related Environmental Perceptions
  - Workplace Satisfaction
  - Subjective Productivity
  - Perceived Concentration

Personal Restorativeness Scale (Hartig et al., 1997)

- Environmental Restoration
  - Being Away
  - Fascination

Swedish Core Affect Scale (Västfjäll et al., 2000)

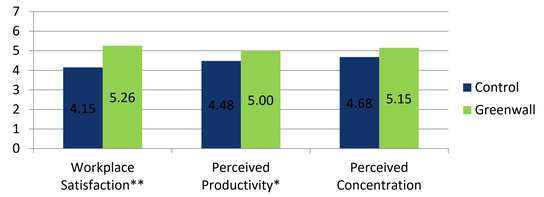
- Mood
  - Valence (pleasant-unpleasant mood)
  - Activation (intensity of mood)
  - Pleasant Activation (activation of pleasant mood)
  - Pleasant Deactivation (deactivation of unpleasant mood)

Results

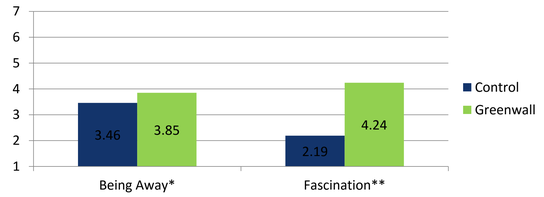
Analysis:

Our analytic strategy was to conduct t-tests to examine experimental (Greenwall) and control group differences after installation on key study variables.

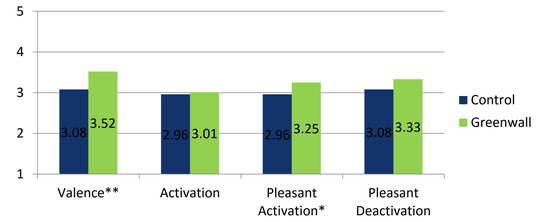
Work-Related Environmental Perceptions (Nieuwenhuis et al.)



Environmental Restoration (Perceived Restorativeness Scale)



Mood (Swedish Core Affect Scale)



Note: *p<.05, **p<.01

Conclusion

- Overall, we can conclude from our research that both general and performance-related environmental perceptions were significantly higher in the Greenwall-enhanced classroom.
- In addition to the graphed results, we found significant differences favoring the Greenwall-enhanced room in perceptions of room pleasantness, room comfort, and air quality.
- Our results are consistent with previous studies showing significant psychological benefits of interior plantscaping in academic and work environments.
- We are currently examining whether these benefits extend to academic perceptions (e.g., academic-related anxiety and academic self-efficacy) and academic performance (e.g., course grades).
- Our follow-up studies use a matched, quasi-experimental design with multiple sections of course taught in the Greenwall-enhanced and control classrooms.
- Our results could be beneficial to the interior plantscaping industry as well as academic and professional organizations looking for evidence-based environmental designs that optimize student and worker well-being.

References

Hartig, T., Korpela, K., Evans, G., & Gärling, T. (1997). A measure of restorative quality in environments. *Scandinavian Housing and Planning Research, 14,* 175-194.

Knight, C., & Haslam, S. A. (2010). The relative merits of lean, enriched, and empowered offices: An experimental examination of the impact of workspace management strategies on well-being and productivity. *Journal of Experimental Psychology: Applied, 16,* 158-172.

Nieuwenhuis, M., Knight, C., Postmes, T., & Haslam, S. A. (2014). The relative benefits of green versus lean office space: Three field experiments. *Journal of Experimental Psychology: Applied, 20,* 199-214.

Shibata, S., & Suzuki, N. (2004). Effects of an indoor plant on creative task performance and mood. *Scandinavian Journal of Psychology, 45,* 373-381.

Västfjäll, D., Friman, M., Gärling, T., & Kleiner, M. (2002). The measurement of core affect: A Swedish self-report measure derived from the affect circumplex. *Scandinavian Journal of Psychology, 43,* 19-31.

Acknowledgements

National Foliage Foundation, Green Plants for Green Buildings, McCaren Designs – McRae Anderson, CAFES, CAS, Falcon Grants and the URSCA Office, UWRF Facilities

UNIVERSITY OF WISCONSIN River Falls


WERNER
GRAINGER


WERNER


WERNER