

Objective Methods for Corroborating Environmental Perception Responses in Virtual Environments: A Research Framework

M. Lindquist

University of Sheffield, Sheffield, UK

Introduction

Landscape can be defined as a visual resource, which acknowledges human vision and hence perception in the definition. Perceptual aspects of landscape necessitate a human component and thus are not only a measure of physical attributes but also reactions to and cognition of physical attributes by people. Recently attempts have been made to link more closely landscape preference and peoples experiences, with virtual environments identified as having developed sufficiently to enable investigations of experiential approaches with significant impacts reported for perception researchers (Bishop, Ye, & Karadaglis, 2001).

3D-Visualization & perception

Visualizations, 3D digital simulations of real or proposed environments, have been used by planners and landscape architects for a generation and are becoming technologically robust. Visualizations can range from non-immersive and static to dynamic and immersive (Danahy, 2001). There is a growing body of empirical research investigating subjective perceptual responses to visualizations (Bishop & Rohrman, 2003; Lange, 2001). Evaluating objectively these subjective responses could contribute significantly to validating preference measured by visualizations.

Objective need

One major criticism of solely relying on questionnaires for virtual environment efficacy and preference evaluation is that they are reflective and occur after interaction. A promising objective evaluation technique is physiological feedback, which in virtual environment research has contradicted self-reported responses.

Research framework

There is evidence from three distinct but allied research areas that indicative physiological feedback could contribute to virtual environmental perception: landscape preference (Chang, 2002); soundscape (Hume & Ahtamad, 2010) and virtual environments (Biocca, 2010). This paper will elucidate a research framework and propose areas for future research of corroborating subjective responses with objective measures.

References

- Biocca, F. (2010). *A Continuous Measure of the Level of Presence Using Electroencephalography (EEG) Recording of Gamma Band Synchrony*. Paper presented at the annual meeting of the International Communication Association, Suntec City, Singapore.
- Bishop, I. D., & Rohrman, B. (2003). Subjective responses to simulated and real environments: a comparison. *Landscape and Urban Planning*, 65(4), 261-277.
- Bishop, I. D., Ye, W. S., & Karadaglis, C. (2001). Experiential approaches to perception response in virtual worlds. *Landscape and Urban Planning*, 54(1-4), 117-125.
- Chang, C. Y. (2002). Psychophysiological responses to different landscape settings and a comparison of cultural differences *ISHS Acta Horticulturae 639: XXVI International Horticultural Congress: Expanding Roles for Horticulture in Improving Human Well-Being and Life Quality* (pp. 57-65). ISHS.
- Danahy, J. W. (2001). Technology for dynamic viewing and peripheral vision in landscape visualization. *Landscape and Urban Planning*, 54(1-4), 127-138.
- Hume, K., & Ahtamad, M. (2010). Physiological responses to and subjective estimates of soundscape elements. In-press.
- Lange, E. (2001). The limits of realism: perceptions of virtual landscapes. *Landscape and Urban Planning*, 54(1-4), 163-182.