Chapter 10

Urban Planning and Climate Change Mitigation: Using Virtual Reality to Support the Design of a University Master Plan Extension

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ABSTRACT

The aim of the research described in this chapter is to explore the use of intelligent virtual transport modelling within the context of a case study involving the development of a university estate. Through the application of visualisation techniques, the study was able to explore how such techniques can lead to enlightenment of potential solutions, whilst simultaneously demonstrating the effects of design solutions on CO2 emissions. Such an approach leads to a better understanding of the transport complexity from the perspective of potential clients and users. Although images and physical models of the case study were appreciated by stakeholders, these did not provide more information than their current state and could not help in making funded decision by decision making community. Animated data, including calculated predictions of the effect of design on daily vehicles, human traffic, and CO2 emission, enlivened and illuminated the designed situation, and allowed decision makers to appreciate the real current and potential challenges.

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INTRODUCTION

The aim of the research described in this chapter was to explore the use of intelligent virtual transport modelling, within the context of a case study involving the development of a University estate. Through the application of visualisation techniques, the study was able to explore how such techniques can lead to enlightenment of potential solutions, whilst simultaneously demonstrating the effects of design solutions on CO₂ emissions. The study arose from a line of research concerning the utilisation of computer-based visualisation in the planning and design of urban public space. Perhaps more importantly, though, the research concerns the manner in which the planning of our towns and cities, including the planning of infrastructure, must adapt to meet the pressures of climate change. It is arguably the case that the impact of most new buildings will be considered as part of a wider planning process, with consideration of the effects on infrastructure and possibly environmental issues. Architectural visualisation, and particularly computer-based visualisation, has been championed for many years. Indeed, it is possible to also trace other strands of participatory design which use non-digital approaches, and which date back to the 1960s and earlier, for example (Arnstein, 1969). However, it is certainly not the case that such research has been widely adopted as normal practice, with visualisation often used to ‘sell’ designs, rather than to genuinely elicit opinion or instigate debate.

The research described in this chapter drew on experiences from CARE North, an Interreg-funded initiative (IVB North Sea Region Programme) aimed at developing ‘a comprehensive, strategic and practical approach to urban and regional transport accessibility in the North Sea Region’. CARE North extended across 9 partners and 4 countries, and included input from ICLEI, an association of local governments committed to sustainable development. Partners include the cities of Bremen, Malmo and Gothenburg, all of which have implemented ambitious programmes concerned with both sustainable transport and the urban realm, and have successfully implemented both technical and social programmes to encourage and support behavioural change among residents and decision makers alike.

The chapter takes a combined philosophical and practical approach, in that the work is placed within a consideration of participation in the planning and design of urban areas. The methods and approach described should be viewed within this context.

CONTEXT

The research described in this chapter has implications for the study of sustainable urban transportation from a number of perspectives. Firstly, and most obviously, the work deals with the situation faced by many organisations as they attempt to relocate a workforce to a new facility. This means that the type of research undertaken here can offer pointers, certainly, for urban design, but the work must also surely have further far-reaching implications for the travel behaviour and preferences of groups and individuals. In the case of the study site reported, the organisation has made efforts to introduce a sustainable transport strategy, yet this requires both potential benefits to the user (e.g. convenience, reduced CO₂, price, cycling facilities) as well as perhaps less positive implications for others (e.g. charging for car parking, and other such disincentives).

Through actions of the EU and its constituent countries, towns and cities across Europe are beginning to address the challenges posed by climate change. The complexity of urban areas means that particular challenges are posed by the needs of residents including energy use in buildings, management of resources and transportation. Whilst it is certainly true that many of the challenges could be met through behavioural change on the part of individuals, it is also true