Geophysical Research Abstracts
Vol. 12, EGU2010-8529, 2010
EGU General Assembly 2010

Using interactive 3D visualisation to educate stakeholders in urban sustainability

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Sustainable decision making in urban design is a complex and non-linear process, which requires the education and interaction of wide variety of stakeholders. A number of sustainable decision support tools have been developed but previous research by the authors has demonstrated that a major barrier to the implementation of tools is the complexity of the environment in which decision are made. In particular, engagement with the general public throughout the decision making process presents challenges in communicating the complex and interdependent facets of sustainability in decisions and also in providing an understanding to stakeholders of the short and long term implications of alternative courses of action.

S-City VT, a prototype simulation and visualisation tool, demonstrates the underlying concepts that allow a wider range of stakeholders to understand, interact with and influence decisions regarding sustainability of urban design. Using the Dundee Waterfront Development Project as a case study, S-City VT takes the unique approach of combining computer game technology with computer modelling to present the stakeholder with an interactive virtual development.

The virtual development is completely interactive allowing users to change the underlying models as well as the external appearance and location of buildings and other structures within the development. This provides a more interactive experience by allowing the user a one to one relationship with the environment they are interacting with, as opposed to existing off the shelf solutions, such as CAD or BIM, that lack in real time interactivity. S-City VT utilises existing games technology research to allow the rendering of virtual environment on consumer hardware opening up its use to a wider range of participants and venues by not relying on specialist hardware.

The visualisation tool employs a number of different methods to display the multivariate sustainability data to the stakeholders. These methods show data in varying levels of complexity, depending on the expertise of the stakeholder, empowering all stakeholders by illustrating trade-offs between indicator values and sustainability. Using split screen techniques the user is able to determine the differences between a number of contrasting scenarios. The tool is also able to model and visualise the indicator values for the different scenarios through time using an animated simulation allowing comparisons to be made over the life of the development.