

 reviewed paper

Plan and Design Together – Just a Vision?

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1 INTRODUCTION

Landscape visualization is a representation of the real world that can be displayed as 3D simulations with various levels of realism (Schroth, 2010). Landscape visualization may demonstrate past, present conditions or future scenarios (Lewis et al., 2005). Therefore, it can be said that landscape visualization gives a chance to display scenes that are non-existent (e.g. current state visualization of altered land use, possible future design scenarios). It can be represented as static, animated or interactive scenes (Sheppard and Salter, 2004) and immersive or outside of the context (Danahy, 2001; Bishop and Lange, 2005).

Human perception towards to 3D visualizations has been studied in recent years by comparing visualization and its effectiveness (Campbell and Salter, 2004; Lange, 1994; Zube et al. 1987). According to comparisons made between visualizations and realism, computer generated environments still need to be developed in order to demonstrate the high degree of realism (Bishop and Rohrmann, 2003). There have been studies investigating various degrees of realism depicted in images, especially in regard to vegetation and moving objects within the virtual environment. However, further study is required for future projects to improve the degrees of realism, raise awareness and stimulate public participation.

In the field of landscape architecture, virtual reality and internet-based landscape visualization technologies (Lange, 2001) and public participation during the decision- making and design process (Saleh and Nassar, 2011) gained rising recognition over the last decade. Development in 3D landscape visualization, now, allows using mobile devices as a valuable tool in landscape design, planning and management (Lange, 2011). There is a possibility that mobile devices can be the standard method for planning and design processes (Lange, 2011).

This paper focuses on the use of interactive 3D visualisation of an urban park to enhance public participation during the planning and decision-making process using mobile devices. The work presented in this paper is part of the EU Project Value+ a collaborative INTERREG IVB project. Unique to the kind of project, the research is linked to a real world investment site. Edward Street Park in the city centre of Sheffield is one of the investment sites in the INTERREG project.

2 CASE STUDY SITE

Edward Street Park is located in the St. Vincent Quarter. Historically St. Vincent Quarter was a typical quarter in Sheffield for the traditional metal and cutlery industry with densely built up terraced housing (Stenton 2010). The area became the home of Irish emigrants. After post-war municipal 'slum' clearances a basketball court had been constructed at the open space of Edward Street. This open space served the entire residential area but was poorly designed and maintained (Sheffield City Council 2004). The quarter was a derelict and underused site with a deprived neighbourhood, which has suffered deep-rooted problems with vandalism, drug abuse, and prostitution. The area is now home to a population with various ethnic backgrounds. New accommodation for students (Castle, Huntsman House and Brearley House) and for young professionals (Impact and Atlantic1) representing high-middle income groups is provided (see Fig. 1). This is next to low-income social family housing in the Edward Street Flats. Edward Street Flats built 1939 - 1943 by Architect Davies are the largest tenement block of its time in the city of Sheffield. Edward Street Flats were built as social housing in the shape of an oval building block with arched entranceways to the large inner green space courtyard., built in 1939 - 1943. The new designed Edward Street Park is intended to serve as a multi-functional inner-city urban park near the University of Sheffield campus.

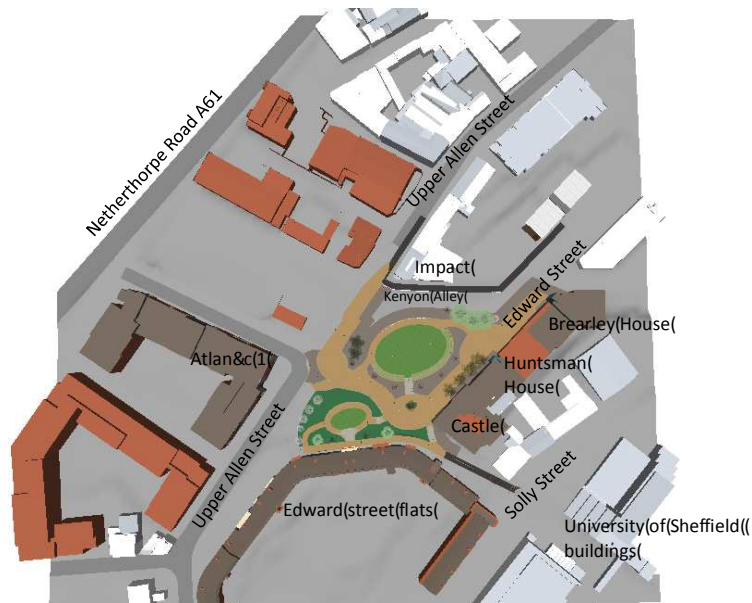


Fig. 1: Location of Edward Street Park

The aim for the new design of Edward Street Park is to engage the various stakeholders using inclusive design tools and techniques, including interactive 3D visualisation techniques to enable them to be involved in the collaborative planning process and participative decision making.

3 VISUALISATION OF THE PROJECT

The 3D modelling software SketchUp was chosen to be used in Value+ project due its availability for everybody with its free to downloadable version Trimble SketchUp, formerly Google SketchUp and due its relative ease to learn and use. Another reason to chose SketchUp was, that vegetation in general, in particular perennials for the flower beds, was seen to be important within the visualisations for Edward Street Park. SketchUp provides the possibility to access a great variety of free plant models in Google warehouse.

As SketchUp is not ideal for navigation and in terms of speed, in addition a real-time visualisation solution for interactive landscape visualisations was required. Therefore the software Walkabout3d from Deliverance Software with its excellent SketchUp compatibility was chosen. Walkabout3d allows easy, real-time navigation of the 3D model environments and can be used for walk-throughs and bird's eye views. Sketch-up data can be directly imported to the Viewer. The Walkabout3D Viewer is a free-to-download software.

On-site, mobile device visualizations (e.g. iPads) are used to explore the views of stakeholders including hard-to-reach groups, students and professionals (Bilge et al. 2014) and to involve the stakeholders in the decision-making and in the participatory planning process. To collect people's design ideas, ZoomNotes - a mobile note-taking application for iPad developed by Deliverance - was used. People were asked to sketch their ideas on 3D models displayed on a mobile device (Bilge at al. 2015).

4 SURVEY

In the Value+ project in Sheffield the views of stakeholders including hard-to-reach groups, students and professionals are sought regarding the usability of mobile device technology and regarding the park design. The opening event of Edward Street Park in September 2013 was a unique opportunity to inform the residents of this neighbourhood and other stakeholders about the recent developments of the park including the 3D visualisation work by the Value+ project. Immersive visualizations have been used in the past to communicate design interventions interactively to the stakeholders (e.g. Hehl-Lange et al. 2012). It is not yet clear how mobile devices can be employed to engage with stakeholders. Participants, with different cultural backgrounds and different income level were asked to give feedback regarding the current situation of the new urban park development. During the day a survey was conducted using a pre-recorded animation presented on an iPad in combination with a questionnaire. At the time of the open day the 3D model was not yet finished.

The respondents of the survey suggest that there is strong potential for 3D mobile device visualisation to contribute to the enhancement of public participation and understanding of design scenarios of residents, including socially vulnerable groups, students and businesses. The respondents rated the level of realism of the 3D model as ‘good’ (mean 4.25 on a 5-point Likert scale), (see table 1 and Fig. 1). They point out that the 3D model enhances the understanding of the space and proposed plan (mean 4.12 on a 5-point Likert scale).

| | Valid (from 81) | n | Mean | Standard Deviation |
|---|-----------------|---|------|--------------------|
| Level of realism of the 3D model | 79 | | 4.25 | 0.646 |
| Enhancement of understanding | 78 | | 4.12 | 0.524 |
| Usefulness of the 3D model on mobile device for the decision-making | 79 | | 4.32 | 0.631 |

Table 1: Respondents feedback on the use of the 3D model

Considering that this survey is based on the draft model, these scores could perhaps be higher if the latest version of the Edward Street Park model with textured building facades (Fig. 2), which gives the model a greater sense of place, would be used.



Fig. 2: SketchUp model for the survey. Fig. 3: Final SketchUp model with textures

5 THE CHARRETTE

A charrette is a meeting activity that allows people to share their ideas about designs and planning. During the charrette, relevant people (stakeholders, citizens/local people, representatives) meet professionals (planners, architects, landscape architects) and experts (government agencies, developers) (Lennertz et al, 2006) to share ideas about the project that they will start or have started designing (Gordon et al, 2011). A charrette usually allows lay people to draw their ideas on paper after the information session regarding the context (Gordon et al, 2011). The most important advantages of a charrette are being most reliable involvement process, as it prevents work duplication or rework, encouraging in-person dialogue by bringing together lay people, experts and professionals together to develop their community via collaborative planning and producing a high quality plan at the end (Lennertz, 2003).

In addition to the survey a design charrette for Edward Street Park took place in October 2013 with students from three participating universities of the UK and the Netherlands. The organisers tried to widen the list of participants to engage local residents (including students, migrants, young people and new residents), small and medium enterprises and NGO's (e.g. ZEST), but due to a weak response the charrette was run as a cooperation between the academic departments of the three participating universities of the UK and the



Fig. 4-6: Charrette: After a site visit students using visual representations to convey their design ideas

Netherlands assisted by South Yorkshire Forest Partnership, the lead partner of the Value+ project, and Sheffield City Council. The students developed and designed further ideas for Edward Street Park based on responses from the survey. The design charrette provided an ideal opportunity to make use of the 3D model and visualisation as a tool in the bottom-up participatory design to support decision-making.

6 ZOOMNOTES

By using the Edward Street VALUE+ Project as a case study, public use and preferences were identified. After the design charrette, the site was visited to assemble feedback from local community by showing a pre-recorded walk-through video of the site. They were asked to specify the problems and problematic areas around the park and where they would be willing to make changes. After having mentioned the part they were suggesting the change, a screenshot image was provided to them to make sketches on them. They had a chance to experience using digital tools to sketch their suggestions on the images they had chosen. ZoomNotes, a mobile note-taking application for iPad developed by Deliverance software, was presented to people with the digital screenshot according to their choices. ZoomNotes is an application that people can use for note taking, annotating, planning or sketching. It provides variety of pens, fonts and colours. It allows easy drawing and writing, and helps users to create editable sketches by converting the rough drawings into the precise geometric shapes.

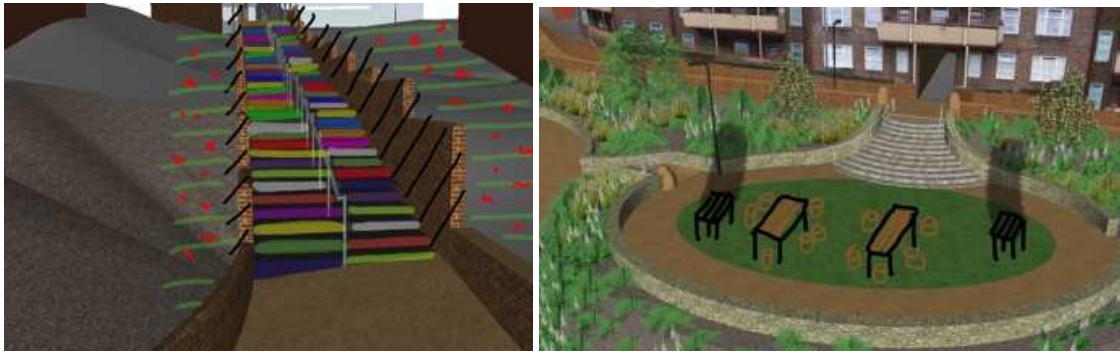


Fig. 7: Sketches made by public via ZoomNotes. Fig. 8: Suggested features in the upper garden

The participants used ZoomNotes with an iPad and made sketches with a stylus pen. In this way, participants were able to make meaningful interaction by drawing their ideas on the 3D model images they wanted to have changes (Fig. 6 and Fig. 7). These helped the participants to understand the project environment better and create ideas in a reasonable way. ZoomNotes allowed people to draw what they want, what they want to see in the neighborhood rather than using verbal descriptions. This approach aimed to enhance the understanding of the space. After the survey and the design charrette, new design scenarios were prepared for future scenarios. For the visualization process of future scenarios Trimble SketchUp were employed. The reasons why SketchUp is chosen for 3D representation are easy of use, availability of the software without any cost.

7 LIMITATIONS

Initial results suggest that the use of 3D mobile device visualization has a strong potential to contribute to the enhancement of public participation and understanding of design scenarios of residents.

Ideally, the charrette would have benefitted from further input and engagement with stakeholders and local residents to develop and discuss design ideas for the park in a collaborative setting and visualise the outcomes as future scenarios. One of the reasons for the lack of interest in participation of stakeholders and residents could be, that the park is not anymore in an early stage of a design proposal. Most of the park was already built, at the time of the charrette.

Some limitations require mention. Since there are 26 different languages spoken in the community, communication sometimes was an issue during the surveys. As English is not the first language of some participants, some tended to avoid communication and those who were willing to participate did not feel comfortable during the survey. Another issue was that people who were not familiar with digital devices. Some residents abstain from using technological devices due to the thought of inadequacy. As students tend

to stay short term around the area, most of them were not aware of the change and did not have opinions about the project.

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