

From Virtuality to Reality

Collaborative Digital Design in the Urban Environment

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This paper describes work in progress on a collaborative project being undertaken by the Department of Art and Design at the University of Luton with the architecture and planning departments at Luton Borough Council and community participation. Focussing on the Plaiters Lea urban zone in Luton, the project uses a three-dimensional digital urban model of the townscape, as a collaborative design and communication tool for urban regeneration.

The proposals being developed include elements of architectural and urban design, landscape design and public art. The philosophical motivation for the project is that of the community architecture and arts movements, in which a wide constituency of stakeholders is involved in the evolution of design proposals. The digital model is the key feature of a world-wide-web site that facilitates the exchange of design data between the participants. Digital modelling work has been used for undergraduate CAD skills development, and students are contributing design proposals as part of their studio work. Hence the project also has a pedagogic component.

Context

Luton, with a population of 180 000, is a medium-size, post-industrial satellite town of London. In terms of the national context, Luton benefits from its central location and function as an important transport node. Luton will continue to be a major employment centre in the south east of England. As the town has limited space for expansion, the planning priority is to enhance the quality and density of the existing urban environment through sustainable economic development and regeneration. Luton has a major international airport, but many of the airport users do not visit the town itself. This is not only due to the peripheral location of the airport, but also the apparent lack of any specific attractions in the town. This represents a missed economic opportunity. The town has a vibrant multi-cultural community, but suffers from a negative image in its more affluent hinter-

land.

Cities and towns throughout the world are developing digital models. These are used for a range of purposes, including development planning and promotion of inward investment and tourism. Research by the Centre for Advanced Spatial Analysis at University College, London, in 2002, identified over 60 different digital models of urban centres throughout the world, demonstrating widespread international interest (Centre for Advanced Spatial Analysis 2002). The Architecture and Building Aids Computer Unit at the University of Strathclyde produced one of the first digital urban models in the UK, to illustrate development opportunities in the Edinburgh Old Town (Grant and Paterson 1994). In their article 'Living with a Virtual City', Alan Day, Vassilis Bourdakos and Joe Robson, of the Centre for Advanced Studies in Architecture at the University of Bath, provide an analysis of the construction

and application of digital urban models (Day, Bourdakis and Robson 1996). In addition to digital urban modelling techniques the principles of virtual design studios have also informed this project. Researchers at the University of Sydney's Key Centre for Design Computing and Cognition have carried out extensive investigation of the virtual design studio concept, in which computer-aided design and internet communication technologies are used to support collaborative design (Simoff and Maher 2000). At the University of Luton, we have been working with colleagues at the University of Technology, Bratislava, on virtual design studios that enable undergraduate students at the two institutions to collaborate on design projects (Dobson, Kosco and Tucny 1998). These earlier projects have utilised web-site, email, videoconference and related technologies, and these experiences have been formative in the development of the methodology applied to the Plaiters Lea project.

Plaiters Lea

Plaiters Lea is an economically and socially marginalized inner urban area, with a transient residential population and a mixture of light industrial, commercial, retail and housing uses. Historically the Area was the centre of Luton's hat making industry. Many Victorian and early twentieth century buildings of high quality remain, but there are also many vacant sites and dilapidated premises. The existing buildings are mainly examples of the hat factories, buildings of unique functional purpose and form. Post-war re-development, including the Arndale shopping centre, resulted in physical isolation of the area, which is bounded by railway lines, the bus station and the heavy mass of the shopping centre. Nevertheless, the Area is a key gateway to the town. Therefore it forms a strong element of the genius loci.

Today the Area provides for a diversity of

functions and populations. Entertainment facilities, accommodation for asylum seekers, student housing, hotels and light industries co-exist within the Area. Plaiters Lea was designated as a Conservation Area in 1991.

Intentions

The physical regeneration and social enhancement of the Area are the focus of this project. The intention of the developments and interventions is to support small-scale commercial activities, to increase the amount of residential accommodation, to encourage greater leisure and entertainment activity, and to strengthen the urban identity as experienced by pedestrians moving through the area en route to the town centre. This is to be achieved through incremental, socially responsive development, on a site-by-site basis, with maximum community participation, rather than the large-scale urban re-development characteristic of post-war re-construction.

As contemporary society evolves and social taboos disappear under the influence of the media and liberalisation, urban environments need to adapt to new realities. The project does not seek to pass judgement on sociological developments, but simply to respond to them in thinking through the future shape of the urban environment. The project recognises this by operating at the interface between urban policy, urban design and community debate.

The intention is to encourage a multiplicity of conversations about the future of Plaiters Lea. The urban design strategy utilises incremental development, working with the scale and grain of the townscape. This is an established urban design theory, derived from the work of Gordon Cullen (Cullen 1961). The basic urban design framework identifies sites for specific intervention and the need to create public space, to reveal the river Lea and to increase pedestrian permeability

(Figure 1).

Plaiters Lea is a conservation area and contains several listed historic buildings. Therefore the new architectural inputs are considerably limited in their volumes and masses. Our strategy is to approach each vacant site individually as a fragment of urban structure, then to combine them into a mosaic of the whole. Each one reflects and represents a certain element of society present within the Plaiters Lea Area, and contributes to the specific identity of the place.

The proposal will demonstrate unconventional approaches to new design interventions in historic areas. Though respecting all relevant conservation regulations, it will present a notion of how such an environment should reflect future economic demands and sociological trends.

Figure 1. Urban Design framework

Figure 2. The Interactive 3D Urban Model

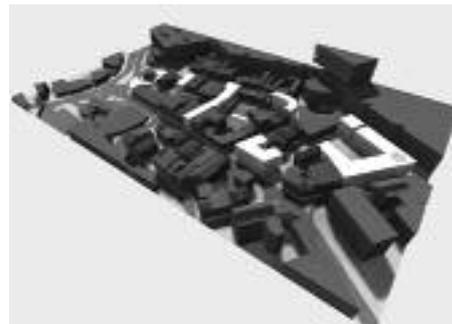


The overlapping of urban and architectural design aspects and fine art is significant for this project. Analysing existing surfaces, proposed uses of new buildings, and the character and identity of the Area informs the development of new patterns of streets and squares. The new buildings are partly determined by the Area's character. Through applying various textures within an existing urban pattern we emphasise the new buildings and improve the Area's originality and attractiveness. Applied textures will be digitally generated from visual elements taken

from the Area. Use of materials, colours and light enables variation in the appearance of the buildings and streets at various times of day and night.

Methodology

The main methodology for the project revolves around the evolution of the interactive three-dimensional digital urban model, which incorporates a variety of visual, text and numeric data, and the construction of the web-site structure that enables the model to be used as a collaborative tool (Figure 2). The ephemeral nature of the digital model enables it to be accessed at any time by all the stakeholders, through simple network technologies.



The focus of the research is to investigate the characteristics and capability of the virtual environment to meet the integrated architectural, urban and landscape design requirements. This collaborative tool allows all involved parties to access and interpret the available information, and to put forward proposals using a variety of media, including CAD models, text and scanned imagery. After completing a proposed design element, new information is added to the model to explain the design intentions. Computer-Aided Design is used not only to support the design, but

also to present technology as a means of design and interpretation.

The public presentation of the project through electronic communication media provides new opportunities for a high level of participation in the design process.

Teams of undergraduate students undertook the surveying and modelling. A critical decision was to determine the accuracy required in the survey and level of detail required in the model. The students were able to gain a valuable insight into appropriate levels of detail and to refine their digital modelling skills in a “real-world” context.

Digital technology gives us an opportunity to combine unreal, i.e. virtual, with real. This leads to a situation where a non-built environment can be experienced as if it existed. Virtual form can respond to a change flexibly, but in our case we are still limited by the existing environment that we supplement. However, creativity and imagination are less limited by structural realities.

The web site is divided into two main sections: “Plaiters Lea Today” and “Plaiters Lea Tomorrow” (Figure 3). The “Today” section provides text and visual information both on the Area and individual buildings. There is also an urban design framework to explain the urban design intentions. A three-dimensional model, of the existing urban environment is also available. The “Photo Gallery” introduces the character and atmosphere of the Area.

The urban design framework is further developed in the “Tomorrow” section, where a general overview and detailed individual briefs for seven key vacant sites are provided. The briefs include textual guidance, general planning diagrams and massing studies. This section also contains the interactive three-dimensional model with a walk-through mode. Within the browser users can watch the pre-set flythrough sequence, switch between seven proposed buildings and see them in their spatial context, or manually manipulate

the camera to move through the model. Communication and collaboration is facilitated through email, discussion board, downloadable site models and design submission functions.



Figure 3. Preview of the “Today” and the “Tomorrow” sections on the web site.

Conclusion

Luton Borough Council wishes to prioritise the Area’s enhancement. The interactive characteristics of our project can be applied for this purpose. Such a digital medium can inform about future design intentions, provide the briefs for developers and architects interested in working on participatory projects, and give an opportunity for communication between the council, designers and public. Designers commissioned to work on a particular site can download all the necessary surveys and site information, as well as submit their proposals electronically. The submitted proposals can be presented for public comment. The Area’s inhabitants have the opportunity to take greater control of proposed developments, and are given space to make remarks and express their opinions. In a similar way, such a principle can be applied in architectural competitions. Secondly, such a medium can be applied in architectural education, in particular for distance learning modes. Students can analyse the Area, download the briefs for their assignments, communicate with their tutors, and submit their work to be presented within the web site.

The effectiveness of the browser environment for communication and collaboration is being tested through its use in an undergraduate design

studio. The students are able to engage with digital technologies, and to contextualise their work within a social, political and economic reality; virtual design for real life. Initial experiences indicate that the ability to interact with the three-dimensional model within the browser environment enhances the accessibility of the project.

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