VIRTUreALITY
Digital Urban Modelling as a Community Design Form*

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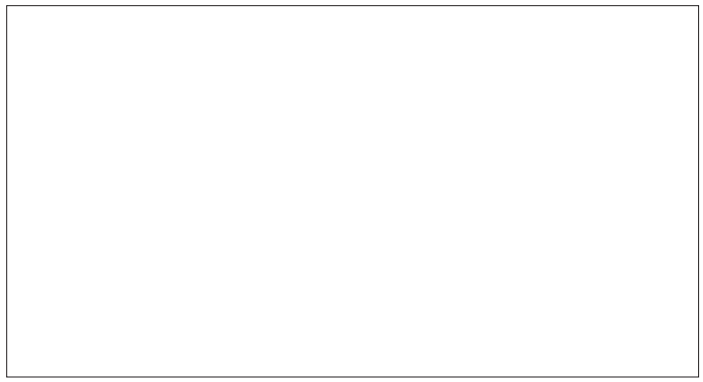

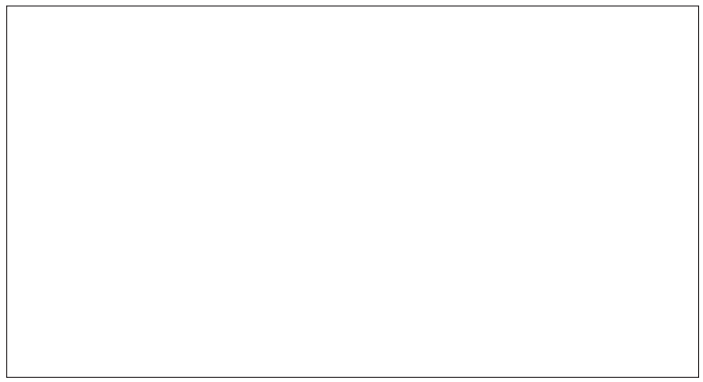

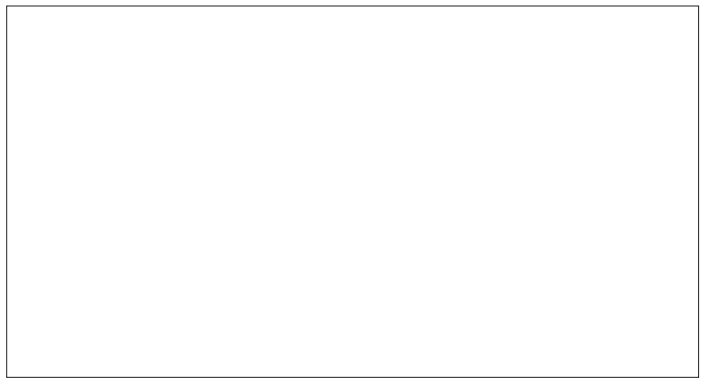

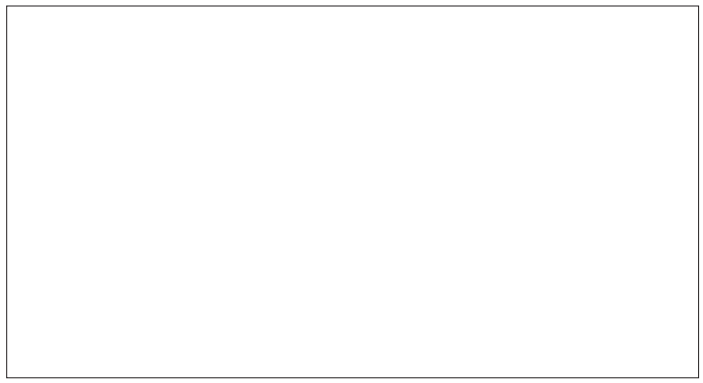

Abstract

This paper describes a practice-led research project that investigates the application of digital modelling and communication technologies in urban and architectural design. The project is being carried out by our team with the collaboration of the architecture and planning departments at local borough council and local community participation. The main methodology for the project revolves around the evolution of an interactive three-dimensional digital urban model, which incorporates a variety of visual, graphic and numeric data. This digital model is utilised within a web site to help facilitate a participatory approach to the physical and social regeneration of an inner urban zone, in terms of both the built environment and the attempted creation of a virtual community.

*A Digital Work In Progress

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1 Context

The focus of this digitally mediated urban design project is the Plaiters Lea Conservation Area in Luton. Luton with its population of about 180,000 is a middle-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 unfortunately 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 hinterland.

2 Plaiters Lea Conservation Area

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 premises. Historically the area was the centre of Luton's hat making industry. The area developed as an industrial zone in the Victorian period, after construction of the Midland railway, being strategically positioned between the railway station and town centre. Plaiters Lea was designated as a Conservation Area in 1991. 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, which formed the original industrial activity of the Area; 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 central shopping mall. Nevertheless, the area is a key gateway to the town.

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 Plaiters Lea. The physical regeneration and social enhancement of the area are the focus of this project. The aim of our urban proposal is to enhance and revitalise the Plaiters Lea Area, which, in spite of its significant location within the town's urban structure and history, has been neglected in the second half of the twentieth century. The intention of the interventions is to support small-scale commercial activities, to increase residential accommodation, to encourage greater leisure activity by day and night, and to strengthen the urban identity experienced by pedestrians. Apart from the potential of the existing built forms for redevelopment and adjustment to contemporary and future needs, there are several vacant sites suitable for new development. This is to be achieved through incremental, socially responsive development, rather than the large-scale urban re-development characteristic of post second world war re-construction. As society evolves and social taboos disappear under the influence of the media and cultural change, urban environments need to adapt to new realities. In terms of sustainability we need to consider the future social tendencies. The impact of economic liberalisation, loosening of social taboos, and increases in personal wealth are forming a new sociological context that is key to new urban development. The project recognises this by operating at the interface between urban policy, urban design and community debate.

3 Strategy

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 (Figure 1) 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.

As the architectural forms are more or less defined, the intention is to emphasize the new buildings by means of application of textures, fabrics and structures of surfaces. The proposals being developed include elements of architectural and urban design, landscape design and public art. Essentially, we are proposing and designing external walls rather than buildings – the surfaces, envelopes of the buildings. The buildings are being perceived by pedestrians as surfaces in a street elevation, and it is an issue of dealing with an environment experienced in this way. Could all the vacant spaces be built up to complete the urban form, or would this create inconvenient obstacles

in the existing living environment? Can new urban surfaces appropriately supplement gaps without interfering with the mass structure?

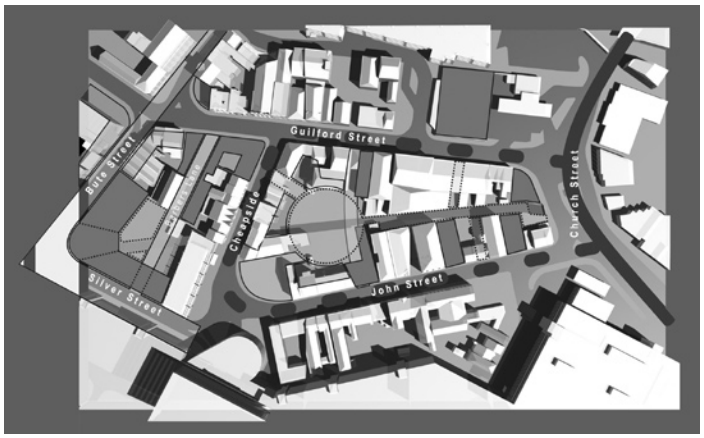

Figure 1. Urban Design Framework

The overlapping of urban and architectural design aspects and fine art is significant for this project. Analysing existing surfaces, proposed uses of new buildings, character and identity of the Area informs the development of new patterns of streets and squares. Texture in architecture begins in detail of a material surface, continues in the combination of different materials or repetition of elements, and then develops into a texture of the street frontage within the context of the urban structure. 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 the visual elements taken from the Area. Usage of materials, colours and light enables variation in the appearance of the buildings and streets at various times of day and night.

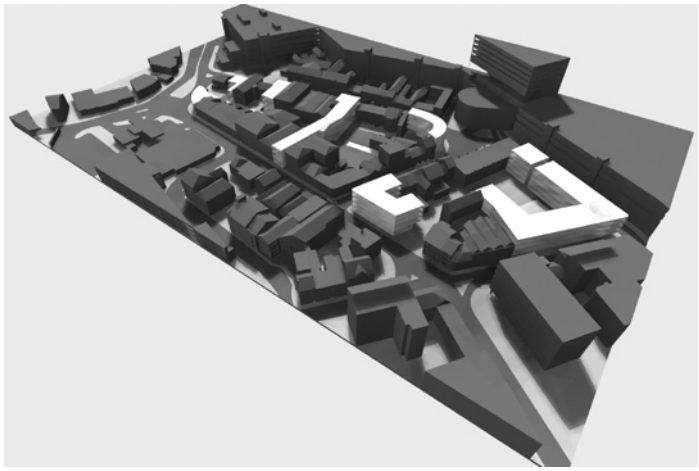

Figure 2. The Interactive 3D Urban Model

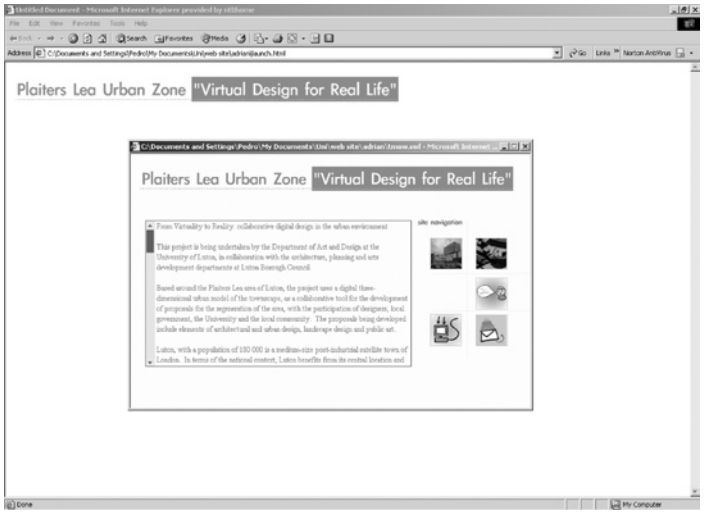

Figure 3. The web site home page

4 Methodology

The main methodology for the project revolves around the evolution of the interactive three-dimensional digital urban model (Figure 2), and the construction of the web site structure that enables the model to be used as a collaborative tool, which incorporates a variety of visual, text and numeric data (Figure 3). The location of the model within a website means that the various stakeholders can access it at any time through simple personal computing technologies.

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 Bourdakis 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 our university, we have been working with colleagues at the

university in Slovakia on virtual design studios that enable undergraduate students at the two institutions to collaborate on design projects. 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.

The digital model produced for this project allows us to present the Area in various contexts and circumstances, to virtually simulate proposed schemes in the existing urban structure. 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. As well as the simulation of the proposed urban scheme we are creating functional virtual space. In such cyberspace originates a new community with new means of communication. Virtual form can respond to 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.” The “Today” section provides text and visual information both on the area and the

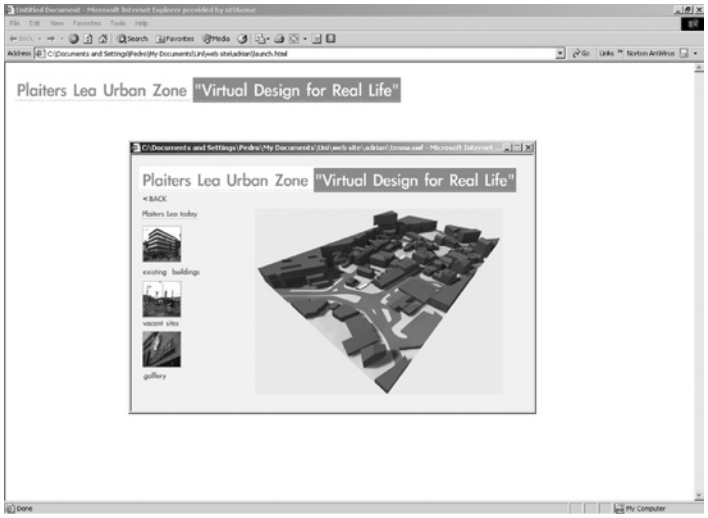

Figure 4. “Today” section of the web site

individual buildings (Figure 4). 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. Several shots in the “Photo Gallery” introduce the character and atmosphere of the Area.

The urban design framework is further developed in the “Tomorrow” section, where a general brief and detailed individual briefs for seven key vacant sites are provided. The briefs include textual guidance, general planning diagrams and rough massing studies (Figure 5). This section also contains the interactive three-dimensional model with a walkthrough mode. Within the browser environment visitors 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 are facilitated through email, discussion board, downloadable site models and design submission functions.

Such a medium has broad applications. First, we can see it being applied in a real context. Luton Borough Council wishes to prioritise the Area’s enhancement. Our product can inform about

Figure 5. A site brief for one of the vacant sites.

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 get to know the area, download the briefs for their assignments, communicate with their tutors, and submit their work to be presented within the web site. Thirdly, there is a potential purely virtual application. Here the real urban environment would be presented in a virtual way. On-line visitors could explore an area that exists for real from their homes. Via accessing the provided information they

could become familiar with the existing buildings and functions. Additionally, there would be virtual buildings proposed for the vacant sites. In this case, the Area would have two kinds of inhabitants and visitors—real and virtual. It is a challenge to enable an interaction of these two communities. Optionally, by giving more solutions for each site, each virtual visitor could create their own environment. Naturally, the medium would have to be adjusted and tailored for a particular use, but also it could be applied for several purposes simultaneously.

Current technology makes it possible to visit a place without actually being present there. This is a stage where real and virtual overlap. The new proposed buildings do not necessarily need to be built in order to be visited and used. It is a creation of a virtual architecture based on real physical urban form. Does the architectural scheme need to be built to become a 'building'? In a virtual world we can go anywhere without leaving our desk or sofa. Geographical location loses its importance when we create a virtual space accessible from a computer located anywhere. The uses we propose for the vacant sites and existing buildings are inspired by the activities that can be also carried out in a virtual world, places of social interaction—library, gallery, workshops, playrooms, entertainment facilities, etc.

5 Conclusion

Computer-Aided Design and Digital Graphic Design are used not only to support the design, but also to present technology as a means of design and interpretation. The creative process will be illustrated in various stages.

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.

The completed interactive three-dimensional digital model and urban design framework have been incorporated within a prototype 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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