

VIRTUAL ENVIRONMENTS AS SITUATED TECHNO-SOCIAL PERFORMANCES

Virtual West Cambridge case-study

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Abstract. This paper focuses on *Virtual West Cambridge* – an interactive multimedia environment constructed to support design and development of a large-scale, long-term urban project. In architecture, such persistent, continuously-growing virtual environments are unusual. Consequently, they pose unique challenges in procurement, development, maintenance and utilization. This paper re-conceptualizes virtual environments as situated techno-social performances rather than software programs or multimedia representations and discusses how this re-conceptualisation can inform their understanding, design and utilisation.

Keywords. Virtual environments; collaborative practice; architectural design; urban design; performative place.

1. Introduction

It is generally acknowledged that interactive multimedia or virtual environments can be useful in many areas of architectural research and practice. And yet, their use in architecture is unusual because they are difficult to make convincing visually, hard to develop, expensive to maintain and awkward to disseminate. The ones that are built cannot compete in visual or functional complexity with those created for entertainment, e.g., for videogames. This paper suggests that some of these challenges can be productively reformulated if such environments are reconceptualised as situated, techno-social performances.

The case study illustrating this argument is *Virtual West Cambridge*, an interactive multi-media environment constructed to support design and development of a large-scale, long-term urban project. At the core of this environment is a three-dimensional digital model navigable in real time. The urban project is located at the West Cambridge site, a growing campus of the University of Cambridge. Construction work there began soon after MacCormac Jamieson Prichard Architects delivered their master plan in 1999 (figure 1)

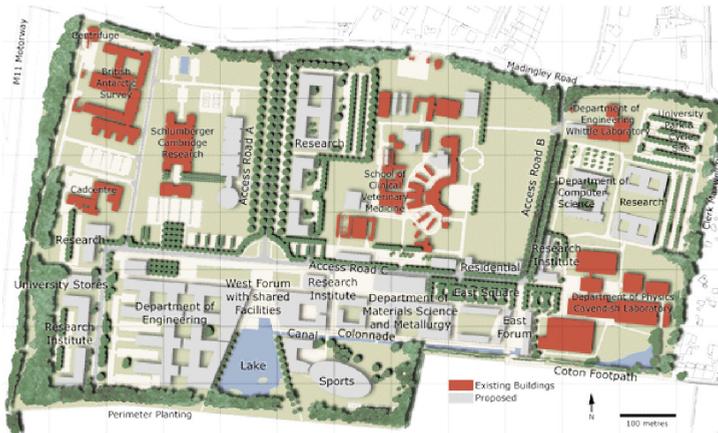


Figure 1. West Cambridge planting master plan as proposed by architects from MacCormac Jamieson Prichard and approved by the university and the planners in 1999.



Figure 2. Panoramic view of the model.

and the university expects to continue the development for at least 20 years.

Virtual West Cambridge began in 2000 as a sub-project of *The Web-based Participation for Campus-scale Project Design* research initiative (Ruffle and Richens, 2001) and has been periodically updated since to reflect the on-site developments.

Virtual West Cambridge integrates a broad variety of content including terrain model, vegetation model, models of existing and planned buildings, a traffic simulation, weather simulations, avatars of human characters and vehi-

cles, several modes of navigation with specialised camerawork and a context-sensitive interface able to deliver multi-media narratives using text, still images, movies and sound.

2. Techno-social performances

This paper focuses on the situated, techno-social performance of *Virtual West Cambridge* and argues that successful utilization of such environments is dependent on their design as hybrid and dynamic encounters that involve people, objects and places. To provide a brief definition, I understand performance as a *collaborative process of actuating relationships*. This generic interpretative frame can be applied to multiple situations and allows to overcome the conceptual distinctions between human and non-human, technical and social, material and processual by re-conceptualising these phenomena as identifiable by and interesting because of their actions – or performances (on networks of actants and hybridity of technology, see Latour, 2005; on places as situated performances, see Roudavski, 2008).

This focus on performance is useful because it can help to overcome unitary, technical interpretations of virtual environments and suggest new approaches to their appreciation, critique and utilisation. To demonstrate, *Virtual West Cambridge* can be readily discussed as a primarily technical, object-like artefact. After all, at one stage we did plan to distribute it as compact disks or as downloads. However, we found that recipients of these artefacts seldom (if ever) attempted to run the environment on their machines, even when they represented the Estate Management and Building Services, an organisation that acted as the primary client and continuously contributed to the project's funding. Conceptual models that interpret virtual environments as technical artefacts or even as a human-machine interactions lack the tools that can expose, explore and explain these social patterns of acceptance and rejection.

2.1. SERIAL PERFORMANCES

To begin, the focus on performative can emphasise that for the majority of stakeholders *Virtual West Cambridge* appears not as a single-user, desktop application but as a series of staged and spontaneous events of varying frequency and duration. These events are staged in offices, studios, seminar rooms and lecture halls; publicly—in large scale at exhibitions, festivals and open-day events; or in chamber settings—during development meetings, internal presentations or weekly briefings of the West Cambridge site-development team. These events varied in size, longevity, focus, recurrence and composi-

tion flexibly adapting to particular situations and attaining benefits impossible through private, single-user, desktop-access encounters.

Sequences of public performances created a cumulative effect, significant for developers, clients and some of the other stakeholders. Repeated encounters with the virtual environment helped to negotiate long-term issues with different groups of stakeholders. For the developers, regular public engagements served as opportunities to receive instructions or suggestions or respond to comments. These encounters guided the technological experimentation and suggested experimental design decisions, directly contributing to the development of expertise shared by a diverse group of collaborators.

2.2. THE CONSTRUCTION SEMINAR

The paper is too short for an extended comparative analysis of different settings. Instead, the subsequent text will highlight the circumstances of one public staging that occurred when the Estate Management and Building Service asked to include *Virtual West Cambridge* into the program of their Construction Seminar. More than 200 UK and overseas delegates specialising in design, construction and education attended this event that “looked at the affordability of high quality standards of architecture and construction, and challenged attendees to consider their role in the continued improvement of working practice in the industry” (EMBS, 2004).

To participate effectively, *Virtual West Cambridge* had to be transformed into an appropriate form, specific to the host space and the structure of the event. As the description below will show, this event depended on the situation surrounding the virtual environment as much as it did on the content it delivered or on the interface it utilised. In fact, it can be said that the situated social performance into which the software object was submerged, began to function as its extended physical / digital / social interface. In this case, *Virtual West Cambridge* was setup in a niche partially sheltered by temporary screens and connected to the surrounding open space that linked main entrances, exhibition areas and the café. This setting created a stage that was visible and well-defined. In the niche, a laptop positioned on a table ran the virtual environment. A digital projector duplicated the laptop’s screen in large format on the white surface ahead of the table. There were several chairs and some empty space behind the table. A poster containing information about the developers hang on the wall and leaflets describing other relevant projects lay on the table.

However common as an exhibition setup, this layout created additional affordances for the virtual environment. During lectures, only a few people remained in or passed through the central core of the building. Between lec-

tures, it became crowded. Two development-team members were usually available at the Virtual West Cambridge niche and in the busy moments, other stakeholders joined in. In quiet moments, the projection showed the virtual environment via an automatically moving camera but most of the time the developers navigated the camera or one of the avatars. The developers' actions attracted attention, demonstrated that the projected images were navigable and invited inquiries from the visitors. In this setting, it was easy to invite visitors to navigate, offer instructions and assistance. The conversations were not limited to those between the developers and the "public." Rather, in the context of the conference where most of visitors had shared concerns, discussions emerged spontaneously from overheard statements, observed behaviour or on-screen events. Compatibly with this atmosphere, the developers, instead of offering formal presentations, improvised, thus retaining opportunities for on-request exploration and serendipity characteristic of interactive environments. Even when not asked directly, they were able to interfere and offer / solicit additional information on the issues that could otherwise remain unexposed. That day, many visitors came to see Virtual West Cambridge more than once. People who first came in a busy moment returned for a one-to-one discussion and a closer experience in less busy times. On the other hand, people who first came in quieter moments returned to see the reactions of others, meet new people and exchange opinions. An immersion into a relevant physical location was also significant because visitors could refer to the character of the surroundings when comparing affordances of various university sites. Such references were relevant because the Centre for Mathematical Sciences that hosted the Seminar was recently completed by the Estate Management and Building Services who also managed the West Cambridge site and were responsible for all other construction work of the university. To summarise, a public performance of Virtual West Cambridge as a hybrid that mixed physical, virtual and social in a relevant location provided a topical forum that fostered meaningful exchanges between stakeholders on a broad variety of issues.

The public socio-technical performance of *Virtual West Cambridge* during the Construction Seminar took place after a series of similar engagement and benefitted from previous experience. However, the interpretation provided above did not exist at the beginning of the project and, even at the time of the event, has not been actively guiding the development. Rather, the theoretical perspective discussed in this paper, emerged as a result of engagements that featured *Virtual West Cambridge*. With hindsight, an implementation of a more systematic strategy designed to explore the characteristics of socio-technical performances and maximise their benefits could usefully inform the

development and utilisation of *Virtual West Cambridge*. What could such a strategy entail?

2.3. THE SOCIAL FIELD

If a similar project were to be attempted again, I would arrange for an analysis of socio-technical relationships relevant to the project. A specific design for such a study would depend on the particular project but would likely take the form of an ethnographic engagement that could uncover unobvious stakeholders, establish significant issues of concern and follow the dynamic interactions between the affected parties. Integrated into the project from the start, such a strategy would support a critical exploration of the issues, enrich and broaden the subsequent public performances of the virtual environments and could result in unexpected contributions and utilisations.

As it is, I find it much easier to trace the technical development of the project rather than the social aspects of its evolution and usage. Like all human endeavours and technical artefacts, *Virtual West Cambridge* is a response to a variety of motivations. Through the years, the project was controlled by a diverse collection of parties with varying interests and goals. Its results were reported to different stakeholders with similarly diverse powers, expertise and criteria for success. During the life of the project, it has been discussed and / or utilised as a three-dimensional component of web-based participation in design; as a pragmatic replacement of a pre-existing physical model; as a test bed for experimentation with interactive narratives; as a publicity instrument and so on. Now, 10 years after the project began, it is difficult to disentangle these goals and motivations, or be clear on their never-ending permutations. While some archaeology of development is possible through interviews and archival analyses, many in-the-moment situations are forever interfused with subsequent authoritative, profit-seeking and partial narratives (including my own) promoting particular interpretations. An important lesson of this experience is that such projects need to be supported from the outset by an interpretative strategy seeking to include all relevant stakeholders and document significant events according to these stakeholders' often startlingly incompatible visions.

2.4. MULTIPLE NARRATIVES

Indeed, the foregrounding of multiple narratives is one of the more interesting achievements of the performative understanding. Reflection on the complex involvements that make up the West Cambridge scheme – or many other architectural or urban projects – suggests that it can be useful to think about

virtual environments as stages for stakeholder conversations (or shared co-performances) rather than pulpits for authoritative argument-making. Assemblies of narratives supported by a variety of representations can better reflect the relational complexities of places than singular interpretations.

Public performances of *Virtual West Cambridge* supported this multiplicity by committing experts and other participants to discursive encounters. Thus, apart from providing support, developers could publicly reflect on the current challenges, critique design decisions, offer information on limitations, explain the political background, share stories of implementation, discuss future possibilities and draw parallels with other projects. Other collaborators (including consultants, clients, site developers, engineers and landscape architects) could support or resist their narratives by providing expert advice on specific issues, contributing alternative interpretations, drawing attention to the concerns beyond those directly represented by the virtual environment and point out the issues on which the virtual environment was incomplete or misleading. A wide range of people beyond those involved with the project could also contribute opinions through discursive public performances. Provoked or encouraged by the virtual environment, various groups of stakeholders were able to question the attending experts.

Public performative engagements cast all of the participants into various, temporary roles: navigators, commentators, advocates, critics and so on. The ability (or need) to change roles in response to challenges arising from the discussions helped the participants to appreciate the spectrum and complexity of the issues making up the West Cambridge development.

Discursive encounters between stakeholders often emerged serendipitously. Navigating or being present next to *Virtual West Cambridge* did not prevent people from overhearing the explanations given by the experts or participating in the discussions. Often, developers navigated through the environment following suggestions of the visitors looking for visual support to their arguments or interested in technical and expressive capabilities of the virtual environment. Other people could hear these suggestions and see their on-screen consequences. Observing the choices and comments of others, visitors often intervened with their own statements of support or disagreement.

Public place-performances of *Virtual West Cambridge* brought together people that normally had little opportunity for communication. For example, researchers and students of the Centre for Mathematical Sciences came to see *Virtual West Cambridge* and were able to enter into conversations with the experts attending the seminar. By presenting the issues in a visual and navigable form, *Virtual West Cambridge* contributed to the task of translation between parties of widely varying backgrounds.

The presence of multiple narratives makes for richer, more rigorous representations. Virtual environments are necessarily constructed by experts (even though new modes of delivery might change this situation) and experts tend to offer narratives that comply with their worldviews or benefit their interests. They do so by focusing on particular aspects, providing targeted visuals, referring to selected examples and presenting their views as logically sound arguments. This focusing on the positive qualities is only natural for designers promoting their projects. However, if unchallenged, experts' narratives can overlook significant issues or ignore important participants. In a public setting, constituents can question the way experts represent design situations, formulate problems and justify design actions.

2.5. DYNAMIC SYMBIOSIS

If, in addition to preparing the software, the developers take into account the circumstances of particular performances, they can, in consultation with other stakeholders, assemble custom configurations to suit the narrative situation, the venue, the audience, the type of intended interactions and the available technical capabilities.

In the *Virtual West Cambridge* project, this attention to specificity of situated techno-social performances suggested a solution that focused on maintaining only one hardware / software implementation. This implementation was developed through multiple field rehearsals and was continuously reconfigured or rebuilt to sustain the ever-growing virtual environment.

Building *Virtual West Cambridge* as a dynamic symbiosis of custom-built hardware and software allowed the developers to save resources while gaining access to the latest technical capabilities (of mainstream hardware). Releasing *Virtual West Cambridge* as an application to be run by generic computers would require more expertise, time and money than non-commercial projects can ever afford. Even developers of high-profile videogames constrain their software to a limited range of hardware to limit the need for testing and servicing. Despite such self-imposed constraints, they usually maintain technical-support departments that provide advice and issue patches long after the initial release. In research or architectural practices, the resources necessary for such provisions are rarely if ever available. Without extensive documentation, institutionalised support or active user communities the *Virtual West Cambridge* software would be exclusionary to people lacking appropriate equipment or unable to make it work.

Logically, a decision to have only one functional instance of a software implementation severely limits its reach. However, in the specific circumstances of this project – seen through the interpretative frame of the performa-

tive conceptualisation – this approach resulted in greater and deeper exposure and utilisation.

Commitment to delivery through public performances delivered through such a continuously supported solution, rather than through the distribution of objects, allowed the stakeholders to utilise a virtual environment in the state of on-going evolution. This exposure of an incomplete environment was possible because the co-presence of developers during public performances eased the entry for first-time or infrequent participants and ensured continuing access to support and guidance during their engagements. The absence of developers from the scene of engagement would necessitate locking *Virtual West Cambridge* into a stable form before any public exposure, as is the norm with most of publicly released software. Commercial software transfers into production only when developers terminate the design development and lock the form of a project into a version number. This closure (temporary if the new version is also planned) enables testing, fine-tuning, debugging, preparation of documentation and the final release. Delivery through managed public performances eliminates the need for closure or explicit development cycles, instead providing the ability to integrate changes quickly thus keeping the virtual environment flexible and open. In *Virtual West Cambridge*, flexibility and openness were essential because the project supported the site in continuing, long-term development. These qualities made updates easy and supported experimentation with technical solutions and modes of representation in parallel with public performances and consultations.

3. Conclusion

This paper used the *Virtual West Cambridge* project to demonstrate how an understanding of virtual environments as series of situated techno-social performances rather than software applications can be beneficial in their utilisation and design. These benefits can help to construct virtual environments that are more economical, efficient, flexible and powerful or, in short, more used and more useful.

In addition to contributing this interpretative frame, the *Virtual West Cambridge* project highlighted a number of difficulties in development and distribution of virtual environments outside of commercial settings that rely on mass sales (of multiple copies, as in the case of traditional videogames, or of subscriptions, in the case of massive multi-player online environments). These difficulties suggest possible directions for future research and design.

These further efforts should be motivated by the desire to actively involve all relevant stakeholders into performative and interpretative events associated with virtual environments. Efforts towards this goal ought to be integrated

into virtual-environment projects from the outset and have to include systematic support and appropriate tools for discovery of hidden actors, unexpected issues/concerns and unobvious interpretations. This work has to be supported by specifically designed methodologies that can integrate ethnographic (e.g., participant observation) techniques that would enable designers / researchers to closely follow the actions of the stakeholders. These methodologies can be informed by the existing work in other fields but will require re-design and adaptation. For example, they will need to incorporate tools able to account for dynamic metamorphoses of socio-technical performances and co-represent their multiple aspects.

Knowing the actors is not enough and sometimes impossible without their direct involvements with the issues at hand. The need to campaign for participation recasts the task of virtual-environment design from the form of a predominantly technical challenge into that of an exercise in curatorship, similar to that necessary for other public events, such as exhibitions, museum displays or even periodic publications.

These efforts to design virtual environments as a series of public events (after all they are intended to be seen) need to be further supported by the technical solutions and conceptual strategies that could flexibly integrate multiple narratives of viewpoints into the representational apparatus of the software/hardware symbioses.

The conceptual model described in this paper and the proposals for future work offered by way of conclusion pose new challenges but also promise rewards for the computer-aided design and research communities.

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