Alt-Space: Audio-visual interactive software for developing narrative environments

Peter Waters
Surrey Institute of Art & Design,
University College
E-mail: pwaters@surrart.ac.uk

Anthony Rowe
Surrey Institute of Art & Design,
University College
E-mail: ant@squidsoup.org

ABSTRACT: Communicating the ethos of a subject (e.g. a brand or cultural or historical narrative) within an environment, such as a museum or visitor centre, is often undermined by the poor integration of digital technologies in the process of interpretation.

This often comes about through a fragmented approach to these environments which fails to take advantage of the possibilities of new media to engage our senses and connect us to a subject.

Our approach to this problem is to create a tool for the creative sketching of space that provides the ability to explore the more sensory aspects of spatial design to test the sequencing of events relative to a narrative.

Through the development of this resource we hope to enable students (and practitioners) to experiment with a wide range of media and test their proposals before committing resources and (inevitably) limited funds[1] to ideas that fail to engage the visitor effectively.

KEYWORDS: Interdisciplinary, narrative environments, multi-sensory, interactivity, accessibility

INTRODUCTION

An interdisciplinary project between the new media company squidsoup and the interior design programme at the Surrey Institute of Art & Design. University College, Farnham, England developed out of the programme's research into reality based virtual spaces and the possibilities offered by blurring the boundaries of actual and virtual spatial design.

A visit by Land Design Studio (creators of UK based environments such as the National Maritime Museum (Cornwall), the Play Zone (Millennium Dome, London) and BAFTA winners for the Famous Grouse Experience (Crieff, Scotland)) to the institute to present the work of

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the practice encouraged the programme to explore these areas further.

Land's multi-disciplinary approach to narrative environments ensures cohesion and a more effective solution[2] than the traditional museum display.

The practice has also pioneered the use of digital technology within their designs in a way that challenges the ubiquitous deployment of touch screens and plasma displays and explores the potential of the new media to interpret a subject in a more engaging way[3]. The Play Zone was the inspiration for the practice's work. Here digital artists from all over the world were effectively 'showcased' and new opportunities for user interaction explored. This, in turn, informed their own design solutions and led to a diverse series of outcomes such as their work at the Famous Grouse Experience and the National Maritime Museum.

At the Famous Grouse the whisky company's humorous advertising campaign is translated into an interactive environment where seismic detectors pick up the vibrations of the visitors as they move around. This alters both floor and screen projected images engaging the visitor in a light-hearted and amusing way and maintaining the company's brand image of whisky as a more 'youthful' product[4].

The synchronisation of all of these elements is critical and access is limited to eight people at a time to ensure the system is not overloaded. The installation was designed simply for fun rather than to explain the processes involved in whisky production. It offers a pre-determined, prescribed experience with no opportunity to delve deeper.

In a different situation it might have been possible to explore other aspects of the culture surrounding the product such as customs and traditions or the differing attributes of whiskies enabling the visitor to interrogate or explore the subject to greater depth through other forms of digital media. For example current low-tech scratch'n'sniff cards (used to identify the complex 'nose' of the spirit) are effective but could be expanded in future through the use of pioneering digital scent technology.[5]

In the Maritime Museum the fusion of artefact, audio-visual mechanisms and interactive technologies combine to enhance the understanding of the museum's collection of sea-going craft, meteorology, navigation, boat construction and the landscape/seascape and tides immediately outside the building[6]. The technology is embedded into the interpretation process enabling the visitor to interrogate and explore the exhibits more freely and to a greater depth than previously.

(see www.landdesignstudio.co.uk) [7]

A funded knowledge transfer project and the engagement of Land's Creative Director, Peter Higgins, as the programme's Course Advisor led to a shift in the culture of the Interior Design programme. We perceived that through the inclusion of digital technologies with traditional concerns of construction technology, spatial composition, materials, colour, texture, light and atmosphere exciting new possibilities for the study and practice of interior design (particularly within environments that feature a strong narrative context) would be possible.

NARRATIVE ENVIRONMENTS

The design consultancy Casson Mann demonstrates the power of these new possibilities to inform, engage and encourage discussion through their work for BNFL (British Nuclear Fuels Ltd) at their Sellafield Visitor Centre in Cumbria, England.

In 'Sparking Reaction', 2002 the visitor is literally 'immersed' in the debate surrounding the use of nuclear power i.e. the pros and cons: the risks involved and the benefits gained over traditional fuel sources. It also touches on matters of major public concern, including nuclear waste disposal, leukaemia and even the misuse of nuclear capability.

Entry is through a stark tunnel that leads to the reception. From here the main exhibition space is accessed and the subdued light and unsettling soundtrack (recorded within the nearby nuclear power station) sets the tone for the exhibition.

The debate, realised in collaboration with graphic designer Nick Bell of UNA, evolves in a darkened environment (named the Core) where six 8 x 6m angled projection screens enable the projection of animated text that metamorphoses into a style that is in keeping with the issues or sentiments expressed as the visitor engages with it.

Getting people to read was the key challenge for Casson Mann, as Roger Mann explains:

'People at exhibitions simply read as little as possible, but as this is such an emotive subject, we felt that justice could be done to it only by including a lot of textual information.'

An interactive immersion cinema, the first of its kind in the UK is featured beyond the Core zone and demonstrates how visitors can be actively engaged through the use of digital mechanisms:

'Illuminated by red neon lighting, the interior of this space contains twenty touch-screen terminals that give visitors the illusion of participating in a TV quiz show. Each contestant is invited to run the country, a job that involves weighing the merits of different viewpoints before taking decisions. At the end, participants are confronted with the repercussions of their choices.

Here, again, visitors have to think, form opinions and face the consequences.' [8]

Their overall solution was well received:

'Casson Mann's design is exemplary in its exploration of how to deal with a large volume of information presented in an exhibition setting. Atmospheric zones and comfortably paced projections engage, provoke and inspire the visitor to think first and decide later.'[8]

Inspired by examples such as Land and Casson Mann we began researching and experimenting with digital technologies that would enable students to engage with these processes and develop ideas within their own projects. The objective was to develop software that would provide them with a facility to explore, test and (ultimately) communicate their proposals through a fully interactive, navigable 3D environment in a way that is not possible through conventional CAD software.

POST-SYMBOLIC COMMUNICATION

Initially the task was to re-evaluate existing procedures. The process of spatial design involves three key stages: experimentation with the possibilities for a space, communication of a design proposal to a client and implementation through to the full realisation of the concept.

Like many other creative processes the full implications of a design are not realised until the design is completed. Prior to this any mechanism for testing or communicating an idea is purely symbolic and often one dimensional:

- Models communicate space in a relative sense but to a scale significantly removed from human scale and can not convey atmosphere.
- A coloured perspective (CAD visual) can communicate atmosphere (lighting, ambience etc) but fail to deal with transitions from one space to another or a sequence of spaces.
- A fully rendered CAD walk-through can convey progression through a series of spaces and their atmospheric qualities but fails to communicate the technical issues.
- Technical drawings can explain how a design fits together but not the tactile qualities of the materials referred to.
- A material sample board enables the viewer to touch and appreciate the qualities (or otherwise) of a range of materials but not the full implications of the material: noise underfoot, durability etc. For this yet more 'devices' are required.

In Riding the Giant Worm to Saturn: Post-Symbolic Communication in Virtual Reality[9] Jaron Lanier talks of a time when, through the application of virtual reality, we are, like Superman, able to 'fly around and pick up a building and turn it upside-down'.

In this way he envisages a time when architects (and interior designers) can dispense with these symbolic, metaphorical representations that require an orchestrated presentation to gain appreciation and acceptance of their designs and use virtual reality to introduce a client to their building. Within this environment a client might say:

> '"Well, let's move this window over," and simply moves it. That is post-symbolic communication. They are actually in the building, and no longer relying on models or animations or specifications or blue prints. They are dealing with a direct experience not a representation of an experience.'

Ultimately, the experience of a museum visitor could be enhanced in a similar way through this ability to probe and explore objects and data to a desired level.

SCENARIO: INTERPRETING THE RAINFOREST

Standing in the middle of the Borneo rainforest amidst trees that soar to 150 feet or more you get a sense that this is to the natural world what Manhattan is to urban environments. The scale, sound and apparent chaos of daily routine envelopes your every sense and yet, though the whole panoply of life and death is played out all around us, we are able to access only a small part of it.

In Times Square we are surrounded by a microcosm of human concerns: lifestyles, gadgets, fantasies, adventures and ground breaking news of tragedies and terrorist acts. This 3D multi-media experience is every channel-hoppers dream: no remote, just turn your head and feast your eyes. The dramas of the immediate environment however are hidden from view as life evolves or disintegrates in boardrooms, apartments or some back street gutter.

The Borneo rainforest is just as effective at concealing the realities of existence from our eyes. We can detect a high level of activity through the cacophony of sound that surrounds us, and changes, almost imperceptibly, with the time of day as each shift clocks off but we struggle to find the source of the noise or witness the dramas that unfold endlessly.
The actual experience of many jungle adventurers is well recorded:

'Many of Borneo's forest trees rise straight up from the jungle floor before spreading out into the leafy crowns that support the rolling green surface of the canopy. The rain forest canopy has been described as an entire plant community above ground. Numerous animals found in this habitat are born and die without ever touching the ground.

As usual in the rain forest, no mammals are visible except for an occasional squirrel scurrying along a low branch and there are only quick flashes of birds in the canopy. Yet the sounds of unseen creatures surround us. The Bornean rain forest is rarely silent. The wash of forest

sounds seem random at first, however, the background drone is an incessant almost irritating whine of cicadas set against the endless "ttok-took-tarook-took-took" of barbets up in the canopy. Punctuating the bird songs are mysterious guttural grunts, roars and barks: monkeys, orangutan, barking deer? These sounds always come from just around the bend. It is never easy to tell exactly from where or what is calling.'

Or memories of:
"…early morning walks in the forest, being greeted by the rich whooping calls of the Bornean Gibbons as well as the symphony of sound from the millions of insects and birds."[10]

'Sounds are an important part of the jungle experience. We awake in the morning and fall asleep at night to the sounds of animals in the trees above us. Frogs sing out "what, what, what, what, what" from ponds along the road to camp. Large tropical locusts make a variety of very loud screeching sounds…. the songs of the locusts reminded us of Skillsaws, imagined nuclear power plant warning sirens, coffee grinders, and chainsaws…overhead is the constant "tuk, took, tuk, tuk, tuk" of barbets. These are bright green birds with many different head colorings that hide in the trees overhead and are rarely seen, but always heard.

Hornbills are frequent companions at Buda…they are very loud flyers, and we are often aware of their presence even though we cannot see the birds through the thick canopy of the trees overhead.'[11]

To actually see any of these creatures you have to go to the nearby Natural History Section of the Museum in Kota Batu about 5km from Brunei's capital, Bandar Seri Begawan. There, in traditional
glass case format with scenic dioramas, is a vision of your worst fears. All of the bugs your search failed to turn up in the jungle contained in one square metre of suspended animation: fearsome, intriguing but lifeless.

Alternatively, if you are unable to travel quite so far, a trip to the Dynamic Earth in Edinburgh might not only give you a better sense of what exists in the primal rainforest but help to communicate aspects of the place that you may never discover even if you remained in the heart of the jungle for a considerable period of time.

Here, the designers employ the usual array of mechanisms; images, video, diagrams and sounds combined with a cyclical experience of changing weather (including simulated rainfall) enabling the viewer to attain some degree of awareness and understanding.

Access to the full subject, however, is filtered by the concerns of the interpreter and the creative skill and inventiveness of the educational team, the designer and current technology. Interrogation of the full story is inevitably, as in any exhibition, not an option. The ability to fly through the canopy, focus on a particular species or gain a fuller understanding of the issues is limited by the mechanisms and skills available.

Ideally a fusion of all three scenarios is required with super-human attributes included: x-ray vision and acute senses of hearing, smell, taste and touch.

The main concerns of those involved in the world of interpretation is essentially that of how best to encapsulate an experience within an environment and bring it to life in a way that communicates a sense of that experience, informing a variety of users with differing levels of engagement.

Lanier's vision of 'Post-Symbolic Communication' would transform this experience and reveal so much more that even the most passive visitor might be engaged more effectively and depart better informed if not inspired.

Example: The Churchill Museum

Such a solution is, of course, a long way off for exploring 3D space, natural or man made, but already some installations are beginning to provide a sense of what this approach could provide. Casson Mann have recently developed a solution for the Churchill Museum in London along with the designers Small Design Firm (software) and UNA (London) Designers (graphics).

Through an integrated flatbed combination of digital mechanisms: timeline, lightbox, filing cabinet and moving images (archive footage) and innovative and engaging graphical devices that evoke aspects of the narrative (e.g. undulating, rippling text that introduces the sinking of the Lusitania) Casson Mann enable visitors to move effortlessly vertically or laterally through 6,000 items that help to define Churchill's life[12].

THE PARTNERSHIP

Part of the programme team's research led Peter Waters and Michael Thomas to visit CADE 2003 where they met Anthony Rowe of squidsoup a Keynote Speaker that year.

After seeing and discussing the work of squidsoup in the area of sensory interaction within navigable, spatial (though abstract) environments a working relationship was formed to explore the possibilities of applying these developments to spatial design.

squidsoup have significant expertise in creating both abstract and reality-based virtual spaces that have explored such intangible notions as atmosphere and sensory perception. Projects of theirs such as 'altzero' (www.altzero.com) [13] and 'Ghosts' (www.squidsoup.com/ghosts) [14] both explore similar issues, but in more abstract terms; altzero comprises a tool (altzerocompose) that allows users to import sounds, position them and control playback, and publish the

resulting compositions for online or offline use. They are also currently building an educational project with seed-funding from Nesta Futurelab that builds on the virtual possibilities of the puppet theatre – the children create puppets from virtual plasticine and enact stories in a shared virtual theatre.

The interior design team have many years' experience of architecture and design in all of its manifestations: retail, hospitality, museum design etc. They provide the project with an understanding of the more theoretical aspects of spatial articulation, structural considerations and the sequencing of narrative environments as well as extensive experience of the processes involved in the communication of 3D space.

The programme is also involved in research into a diverse range of issues surrounding the process of interpretation for example: accessibility for differing disabilities, multi-lingual translation and environmental issues. Membership of an interpretation network and participation in the formation of a new MSc Interpretation programme has enabled the team to extend their knowledge of interpretative environments to inform the project.

PROTOTYPE SOFTWARE DEVELOPMENT

The project team developed the prototype application (figures 1 & 2) for the creative sketching of 3D internal spaces providing the ability to explore the more sensory aspects of spatial, narrative design.

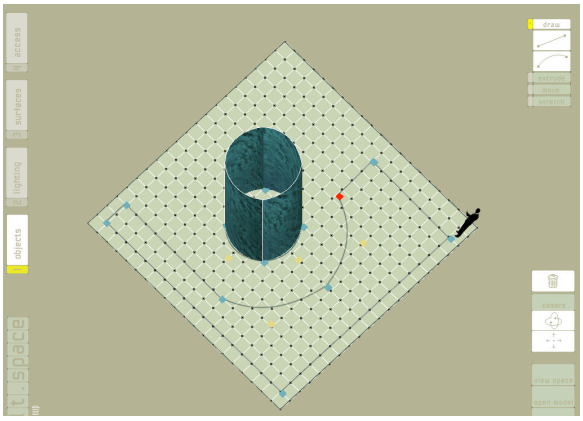

Figure 1: A simple grid enables the user to map out the space

The main focus was on creating a tool for rapid prototyping / sketching of ideas, to get a feel for atmosphere and other relatively intangible aspects of space design.

The emphasis was on ease of access through an intuitive interface and appropriateness to the experimental stage of a project rather than the processes involved in conventional CAD packages which relate to the other end of the process i.e. communicating a design to a client.

This form of communication requires expensive, specialist software and skills and is too far along the design path to effectively influence the exploratory stage of a project.

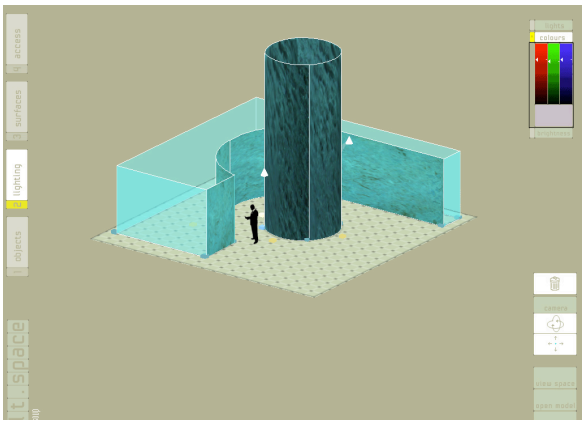

Figure 2: Scale can be manipulated in a relative sense by increasing or decreasing the figure in the foreground

This initial prototype includes:

- physical space design
- basic object design within a space
- navigation through the space, and interface design
- sound representation within the space
- control over texture, scale, light and shadow
- human representations within the space
- asset importing (sound, image and video)

The project focussed on the following key areas in order to be able to evolve a realistic and relevant solution. The end result was a usable piece of prototype software with a view to enabling staff and students at the Surrey Institute (and other interested parties) to test the prototype and provide feedback.

The key issues / developments were:

1. Navigation through the space.
   - Speed of movement through a space providing an impression of scale.
   - As, in this program, walkthroughs are freely navigable spaces, mechanisms to limit movement (i.e no-go areas, one-way doors) have been incorporated.
2. Sound representation within the space. Spatially positioned sounds can be imported into a space and located.
   - Control over range (and echo/reverb and other real-time effects). Background noises, people noise.
3. Control over texture, scale and light.
   - Walls can be coloured/tinted and painted.

- Textures and video clips can be imported and positioned on a wall.
- Lights can be positioned and coloured – this can be used to simulate daylight. Although shade is dealt with effectively, shadows are not currently a feature of many real-time 3D engines. We envisage simulating shadows automatically through phase 3 of the project.

4. Human representations within the space – human presence within a space is a vital part of creating a sense of perspective, scale and life (figure 3).

   - A strong visual method for creating the impression of others' presence within a space has been achieved by using alpha-channelled layered textures on planes. This has a considerable performance benefit over solid 3D dummy models, as well as being far more textural and visually appealing. This will be combined with appropriate audio feedback.

Figure 3: Representation of people within a space

5. File saving and exporting projects. A self-contained player is anticipated for phase 3, together with a mechanism for recording specific walkthroughs.

6. Basic object design within a space. Two methods were used here.
   - Importing textures with an alpha channel, which can then be placed on dynamic planes (same method as for people, above)
   - A simple object designer, allowing for the creation of shaped planes that can be combined to create furniture and other features.
   - Fine-tuning of interaction, modelling tools and the interface design (figure 4 & 5).

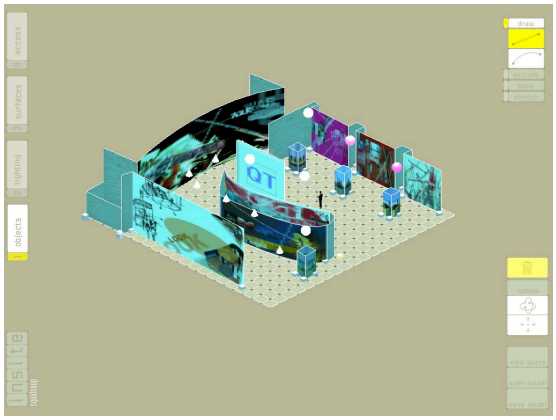

Figure 4: Objects, graphics, lighting, texture and movie files imported

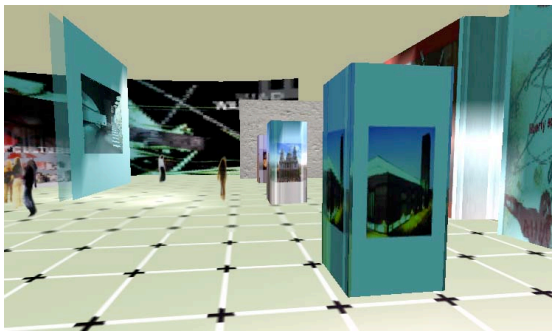

Figure 5: Part simulation of the space with sound and video

FUTURE DEVELOPMENTS

These developments are the early stages of a project to create an intuitive design tool that will raise the level of awareness amongst our students and enable a more informed approach to the design of narrative environments or space generally. Initial feedback from the students is very positive particularly from those students well versed in the use of conventional CAD programs.

Our eventual aim is not only to change our student's perceptions but transform the way space is perceived.

As Alberto Lacovoni states:

'If the main objective….is that of reconciling the individual with his environment, overcoming that form of spatial alienation which is caused by the impossibility of transforming it according to one's desires, operating creatively within the "zone of uncertainty between subjectivity and objectivity, between the imagined and reality" (Morin 74), then technology can become a very powerful instrument of modulation.'[15]

As a result the programme team are now sourcing funds and partners to continue the work with squidsoup and extend the project further.

Through subsequent stages we will be seeking to incorporate the use of VR Caves to enhance the experience of movement and interactive navigation.[16]

This phase of the project will also refer to concepts surrounding subjects such as game design and storytelling as a means of exploring, evolving and communicating a proposed environment. [17]

We will also focus further on future possibilities based on the process of interpretation through subjects as diverse as the natural environment, cultural and heritage sites and brand communication.

Ultimately, we hope that we can develop the software sufficiently to test mechanisms relating to accessibility for a wide range of disabilities through the use of VR caves, data gloves and other modes of interaction.

As the project is still in the early stages of development we are seeking feedback from visitors to CADE and the possible involvement of interested parties to realise the program's full capabilities.

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