

## A SOCIAL DIMENSION TO DIGITAL ARCHITECTURAL PRACTICE

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**Abstract.** In 1995 the first in a series of three books were published by Academy Editions, that have since become a vivid handbook that documents how designers responded to the development of architectural drawing applications and the growth of the internet, to establish a form of digital architecture. Offering dramatic images and emotive texts, many of the architects and designers featured in these books deeply affected the perception of digital architecture's mission by students and elements of the design community. Concentrating upon how to resolve the view that time and space are separate dimensions, and the immersive and dematerial potentials of cyberspace, the developments of this 'cyberromanticism' (Coyne 1999) ultimately were not used to sustain digital architectural activity. This paper uses the Academy Editions series to understand how such a vivid aspect of digital architecture failed to fulfil its aspirations. The paper begins by establishing the premise for digital architecture through a link with mainstream architectures interest in the concept of shelter. Through a summary of the practical and theoretical methods outlined by the early designers within the series of publications, the paper demonstrates the critical potential of the field. However a summary of how the proliferation of early imagery fuelled a visual mannerism traces how the third Architects in Cyberspace publication represented a crisis in both identity and practice. The paper then identifies an opportunity for recovering the theoretical imperatives within digital architecture by reflecting upon the emergence of 'interactive architectures' use of a 'social' dimension that was previously hindered by the use of computer applications in early digital architecture. The paper closes with a reference to two of the authors practical projects that use social data to inform the generation of digital architecture.

### 1. Finding Shelter in Digital Architecture

In the first edition of *Architects in Cyberspace* published in 1995 by Academy Editions, key questions were asked such as: What constitutes a city? How far do our bodies reach? Who can see me? Can I live in a virtual reality? Who can I talk to? What are the rules of a new space? These questions were explored and stimulated by the science fiction writers such as William Gibson and Neal Stephenson, who provided literary starting points for imagining what a virtual architecture might be like. Through *Architects in Cyberspace*, designers and academics used the critique of the fundamental tenets of architecture - such as 'dwelling' that modernism had dismantled - to define their practice. Dwelling becomes a key architectural term which allows us to understand the context in which digital architecture emerged. Its critical, postmodern programme was due to the differences that digital systems offered to the industry of constructing buildings.

Dwelling, prior to the Enlightenment, can be understood as having more than just a functional imperative. In addition, it was closely linked with worship and expressions of power, as though an attachment to a space was connected with the religious and political structures to which its subjects should be subservient. The embracing of technologies and the movement to modernism "free[d] people from the limitation imposed on them by family or clan or by their village community, offering them unheard-of options and often material improvements as well" (Heynen 1999). In doing so, there was an ensuing loss of particular certainties such as the sense of 'being' that Heidegger sees as being intrinsically tied to the concept of 'dwelling'. Through the mapping and subsequently the commodification of space, Heidegger suggests that the Enlightenment separated us from an intrinsic connection to land and, in doing so, we lost our sense of 'dwelling' (Heidegger 1971).

By tracing the term 'building' back to the German phrase 'buan', which is related to "I am", Heidegger concludes that building and dwelling are closely bound to the concept of being. For Heidegger dwelling does not stem from building, but the reverse; building comes from the need for shelter and a sense of being in the environment.

"The nature of building is letting dwell. Building accomplishes its nature in the raising of locations by the joining of their spaces. Only if we are capable of dwelling, only then can we build." (Heidegger 1971).

However, as Modernism concentrated upon the machine and the development of the city for a space for living, an insurmountable distance was created between the metropolis and a place to dwell. Subsequently, as dwelling receded, building took on a new aggressive form in which modern homes such as bungalows and apartments constituted new living

environments and the attraction of the city led to migrant populations and homelessness.

In *Architects in Cyberspace* a new form of 'homelessness' was identified through the use of the internet, but its interpretation was more constructive. Stephen Perrella described the 'loss of being' as a central part of the cyberspace experience, one in which there is an 'omnitemporal logocentricism' (Perrella 1995) or an 'anywhere, anytime' through which we find ourselves further dislocated from a sense of place. These writings were part of the beginnings of a new movement in architecture, in which dislocation and 'homelessness' were embraced as powerful attributes of a new type of space, rather than symptoms of an old one in crisis. Digital architecture represented an opportunity in which a reconciliation between dwelling and modern technology wasn't necessary, because there were ground rules for a new type of space in which architects could regain the power to provide meaningful spaces. Cyberspace provided the re-establishment of a 'metaphysical, even theological dimension' (Larner and Hunter 1995) to space because it was constituted by a person to person communication. It constructed an 'instantaneous dynamic consciousness' (Larner and Hunter 1995) with the potential to develop new aesthetic forms, away from the lineage of art and industry, and across the borders of countries and continents. The implications of the development of the borderless environment of the internet was one that offered an exciting element of lack of control and an element of decentralisation. Reliant upon its development by a rich mix of users, the boundaries and territories could not follow the planning models of any one individual's authoritarian dreams. For Sadie Plant the "continual flux and change" that is offered by a highly socialised development offered an antidote to the consequences of Modernity in which "the sciences, arts, and humanities lose their definition and discipline: law and order fall into decay; social bonds slip beyond repair" (Plant 1995). Roy Ascott's conceptualisation of this organic model of the network of the internet led him to the term *cyberception* which "involves a convergence of cognitive and perceptual processes" that become "locked socially and philosophically" through the web to support a new model for seeing both virtual concepts and spaces as well as a close attachment to actual natural systems (Ascott 1995). In the context of architecture he laments the lack of biological and social systems that are evident in classical and modern design, and sees both the actual and the digital city as a "space to share, collaborate and participate in the processes of cultural evolution" (Ascott 1995).

Through this critical engagement with Heidegger's argument that Modernism had disembowelled the concept of shelter, *Architects in*

Cyberspace offered a new opportunity for designers to overcome the sense of loss from being attached to a place, by embracing networked, space.

## **2. The Promise of a Digital Architectural Form**

The architectural form that cyberspace would take became the key point for many texts of the period. Digital Architects became determined to demonstrate visual and interactive potentials distinct from those of technicians who developed virtual 'mirrors' of actual space. Marcos Novak recognised a 'post-Cartesian' opportunity offered by interacting with digital systems as time and space became interwoven. Setting a scene for his own aspirations for more geometrically challenging interpretations of architecture in cyberspace, Novak described the historical use of time and space as being features of particular disciplines: "architecture was the art of space... and music was the art of time" (Novak 1995). He expressed a disappointment with modernism's inability to keep up with mathematical developments through the 20th century. Novak identified the underlying Euclidean mathematics, which informed structures of the International Movement, to be evidence of a lack of critical development for architecture, and demonstrated a lack of engagement from a world which was moving toward quantum and relational models for understanding space. Subsequently genetic engines and higher dimensional maths that integrate transformation and time were the technologies for Novak's propositions for non-Euclidean architecture in cyberspace.

Karl Chu (1995) extended these through theoretical visions of how the internet itself may evolve through self organising systems to manifest structures that we can only begin to imagine as our "conception of territory, of dwelling, of identity, of the phenomenology of existence and being will no longer be the same" (Chu 1995). By using the emergent processes involved in computer models such as Cellular Automata, Chu dispelled the dominant teleological conception of 'process' that he sees as central to the Enlightenment and which remained part of modernism into the 20th century. Through the 'morphogenetic' nature of CA behaviour, Chu introduced the term Modal Constructivism. This offered an organic model for the emergent architectural systems that would begin to appear in the context of the internet. For Chu, cyberspace offered a distributed and decentralised framework in which "traditional conceptions of territory, of dwelling, of identity, of the phenomenology of existence and being will no longer be the same" (Chu 1995). John Frazer identified the etymological root of cyberspace as a critical opportunity to endorse the use of genetic and complex systems for architecture (Frazer 1995). Cybernetics and architecture were linked through many activities of architects in the 1960s. Frazer suggests

that the 'products' of such thinking which were in 'the relationship of forms' were manifested in architecture and the arts by people such as Buckminster Fuller, John Cage and Marshall McLuhan. For Frazer, digital architecture had the computational power to focus not on 'products' but 'processes' that can accelerate evolution and grow relationships between forms and users.

The non-material nature of such a new space ultimately becomes non-visual and highly social as Dunne and Raby considered not just the visual representation of an internet, but the electromagnetic fields that support its networks. Cautious to identify themselves as pioneers of an 'abstract digital space' they concerned themselves with interfaces to actual people or places through digital systems. Their research project, *Fields and Thresholds*, situates an opportunity for digital architecture in creating 'translucent' connections with people and places. Concerned with the assumption made by technologists that society can deal with transparency in technologies such as the telephone, the designers plotted out a framework of practice that blurs telematic and physical space to support "the more subtle complexities of our social skills into the world of telecommunications." (Dunne and Raby 1995). Their highly sensitive proposals were notably different to that of many other published 'cyber architects', and there is a deep vein of industrial design embedded within the objects and situations that they focussed upon. All of the contexts were very physical, and focus upon reconciling the gaps formed by 'modern' technology between the relationships of people and spaces, rather than in speculating about new systems or future worlds. Dunne and Raby's sensitivity to technology and its implementation is evidence of a concern for digital architecture not to become a hyperbolic path for technologists to indulge in post-modern futures, but to offer a means of understanding the nature of cyberspace before it becomes colonised and represented using predefined techniques.

This range of work, many of which was in its infancy heralded modes of practice that would support the emergence of cyberspace that would extend the theoretical potential of architecture through new and radical practical methods. However, as the series of publications develops toward its last in 2002, the form of design that emerges offered fewer and fewer methods that met the early proclamations, and instead tend toward a mannerism of image and form that suggest a misinterpretation of the cyberspace.

### **3. Running Out of Digital Space**

"Architects dream in cyberspace, escaping the constraints of matter and gravity. They dream of folds and dynamic form, or constant fluidity. A visual pornography of space denied, as yet, to biological material until it too can vaporise and contort. Our stable fleshy

bodies remain on the outside looking on to windows filled with representations of forms and spaces we can never touch.” (Dunne and Raby 2001)

Dunne and Raby’s (2001) distinction of their own work not being related to the ‘visual pornography’ that is dreamt up by other practitioners appears as a specific criticism for a field that failed to escape the inertia of the aesthetics that attracted so much attention in the mid-1990s.

As the screen-based works that appeared in *Architects in Cyberspace* galvanised careers, styles began to be mimicked as younger designers copied styles without method. Digitally produced architectural images found a niche in providing images of the future in a way that excited audiences, and whose production was relatively undemanding compared with say, a slow-to-render animation. Lifestyle and design magazines such as *Wallpaper\** and newspapers such as *Die Zeit* began to commission young graduates from the Bartlett School of Architecture who demonstrated that they could design and manifest architectural solutions for the magazine’s audience. Rarely engaging with any of the theoretical discussions that were part of the brief history of using the technology, the works were spectacular demonstrations of virtual spaces for people to dream about owning. These visions of spaces closely referred to the Modernist tradition for designing futures, and such over-ripe imagery may be seen as an immature demonstration of architecture’s least critical activities. Through magazines, and eventually television, the students who were emerging from educational environments became cultural currency as their control over the aesthetic manner of digital technology was exploited. Before long, digital architecture became synonymous with developing computer-generated backdrops and television commercials for the likes of *Match of the Day*, MTV and Nike. Packages such as 3D Studio Max and Maya are used to render 3D imagery, and video compositing software used such as Adobe After Effects to integrate them. Small architectural offices such as Softroom and General Lighting and Power - although exceptionally talented in the use of the technology provided for them - are not primarily interested in critiquing the software or its application. They use it not in a provisional role, but at the limits of what it is designed for.

“Obviously those who create animations of architecture are limited by the newness of the medium and the fact that much software is designed for industries other than architecture. The appropriation of software has caused many practitioners to press all the buttons simultaneously, or layer a million filters on top of one another for pure unadulterated affect. Such software is conceived to depict surfaces or graphics that have little to do with the modalities of architectural production.” (Spiller 2001)

Neil Spiller introduces the 2002 publication of *Reflexive Architecture* as the missing *Architects in Cyberspace Three*. Based on the ‘clamour’ for actual architecture within the field, and the limited interpretation of digital systems by many architects, he decided to launch a new title as a means of encompassing what can be understood to be the evolution of the field (Spiller 2002). Highly aesthetic and featuring contributions from staff and students who have studied at the Bartlett (where Spiller is a professor) as well some of the original contributors (Novak, Dunne and Raby), the publication concentrates upon qualifying the integrity of a field that has been misunderstood. “The Reflexive lifts the soporific cover on what is fast becoming convention in the treatment of the digital – those all-too alluring and pervasively smooth computer-generated forms.” (Castle 2002)

#### 4. Finding Solutions in the Ashes

Spiller’s renaming of the digital architecture series represented the end of an enquiry that was initiated in a critical engagement with ‘shelter’. However through the proliferation of styles and effects without theoretical method, the power of the imagery overwhelmed the research projects ability to sustain an enquiry into constructing places in cyberspace. However in the desire to distinguish practices from the sinking ship that was digital architecture, a critical dimension to architectural was identified in the publication of a further collection of works; *Interactive Architecture*.

Different from the speculative *Architects in Cyberspace* publications, *Interactive Architecture* is a title and range of projects that have already been built and installed as architecture. Replacing the fantastic images of cyberspace, images of functioning works by Haque, *United Realities* and *Decoi* anchor architecture’s control of digital systems, an area which was becoming abstract and perhaps self indulgent.

“Since the Industrial Revolution and the rise of science fiction, the popular impulse has often been to regard technology as a socially derisive and potentially malign force. In the 1990’s, this was further exaggerated by the spectre of cyberspace with its promise of the domination of the virtual over the physical. It engendered visions of a horrific netherworld responded to by even the most subconscious of neuro twitches. This issue of AD turns these angst-ridden visions on their head. Here, spatial design skills and adept application of digital technologies are pooled to aid interaction.” (Castle 2005).

Castle’s description of digital architecture through the 1990s seems to diminish many of the theoretical sensitivities that were explored by Spiller, Novak, Perrella, Chaplin and Chu. Finding solace in the application of interactive architecture is an avoidance of the critical questions for

architecture that were explored through the subject of shelter when dealing with post-Cartesian systems. Interactive architecture should not be understood to be an evolution of digital architecture. Its use of mechanics and engineering systems to move, light and allow interaction in the actual world returns architecture's palette of tools to a post-modern relationship with space that foregoes any attempt to theorise or practice a relationship for architecture in a digital space. Lucy Bullivant's opportunity for interactive architecture - "treating digital media as physical matter" (Bullivant 2005) - not only places gravity into the digital by returning it to a form easily handled by familiar techniques, but also renders it passive again as though it is a dumb material. Despite this, interactive architecture evidently offers architects some attractive attributes that digital architecture didn't address. In further qualifying the difference between the two fields, Castle infers a complex social context that is acknowledged by interactive architecture: "Web and remote technologies may be the props of the contemporary world, but it is the underlying social forces of individualism and an unrelenting work culture that most often distance us from each other, rather than the gadgetry in our hands." (Castle 2005).

While *Architects in Cyberspace* and *Hypersurface Architecture* concentrated upon the conceptual tensions of space, time and shelter in the internet, interactive architecture also focussed on social dimensions. Bullivant presents the space for Interactive Architecture as being located within the "threshold between the virtual and the physical" (Bullivant 2005). Reminiscent of Dunne and Raby, and Chaplin, she establishes a 'sociospatial' context in which interactive architecture is the bridge. The social priority embedded in interactive architecture is noticeable throughout works that use mobile, pervasive, locative, electromagnetic systems, many of which have physically animated, malleable and structural properties making them architectural features and installations.

The 'social' as priority has had a limited presence in the digital architecture that was speculated, or that materialised through *Architects in Cyberspace* with only two of the articles featuring a social agenda. The geometric, mathematical, genetic, structure and form based enquiries of digital architecture has subsequently developed largely without any inclusion of social characteristics. The stylistic mannerism of the graphics that emerged toward the end of the 1990s contributed to a split in the field between practice based work that disassociated itself with the screen based forms and structures, and a theoretical strand that has pursued many of the original ideas through the revised theme of '*Reflexive Architecture*'. Both remain vividly energetic at fulfilling particular research interests within digital architecture. One is interested in physical materialisations, and the other the theoretical aspects of digital architecture. The neglect of a social

agenda, however, and the emerging dominance of the geometric and mathematical elements of the field, can be associated with the tools that designers used to materialise their theories. Although digital architects used drawing packages such as AutoCad and rendering applications such as 3D Studio Max, their primary toolset wasn't programmed to include social properties. Designed for mainstream architecture and graphic visualisation, the Autodesk suite of applications has dominated the field and features all of the Cartesian properties for planning the construction of new buildings. It even permits complex warping and bending of forms to produce 'hypersurfaces' - but none of these are socially dynamic. The proliferation of graphic 'lipstick' (Toy 1998:7) produced by young designers who were employed by media industries was produced entirely using the 'off the shelf' suite of applications that were not designed to extend the practical objectives of digital architecture's theoretical aims. As software developed through the 90s, a new technology was heralded within 3D modelling that claimed to use a calculus-based system to create curved forms; NURBS (Non-Uniform Rational Bézier Spline). NURBS became part of 3D Studio Max, Alias and Maya modelling applications and offered a means of making fluid curves that the Cartesian X, Y and Z coordinate system of traditional packages inhibited. Implemented together in software packages it became very easy for designers to create fluid forms, the skins and surfaces of which readjusted as points in space were altered (Imperiale 2000). "The use of NURBS-based computer animation programs such as Alias or Maya has had a liberating effect on the design process, allowing architects to work on topological surfaces with increasing levels of complexity. The Deleuzian focus on smooth spaces, seriality and dynamic processes seems to have found its perfect foil in these programs. One should be cautious, however, in making reductive statements that would equate good design with complex form, or for that matter in denouncing sinuously curved architecture as merely a stylistic choice." (Imperiale 2000). The NURBS technology provided a useful tool for allowing Cartesian coordinate based applications to render complex forms quickly, but this does not fulfil the theoretical aspirations for a post-Cartesian approach to form and structure. It simply compounded the perception of digital architecture as producing dynamic, slick and futuristic forms.

While the momentum behind modelling extends the distance between the designers and social factors, contemporary computing software is highly network-based, with data correlation a principal part of its use. The merging of one dataset with another to generate new forms of information is a significant field within computer science. Information visualisation uses computer graphics to present vast forms of data in ways that allow users to interpret them quickly in order to build assumptions and aid reasoning. The

breadth of datasets that are mined and visualised is highly varied and includes many forms of social, cognitive and biological data. Although often too specific for buildings, the neglect of digital architectural systems to begin correlating social data with modelling and design appears a serious omission. While contemporary architecture packages have extended their use beyond that of simply offering drawing and rendering modes by linking to technical and materials databases, there is a surprising lack of people in any of them. From materials, costs and schedules, software such as *Archi-CAD* allows the designers to design buildings to meet specific deadlines and budgets. Packages such *Virtual Environment*, developed by IES, even allow the import and construction of 3D models to test for environmental conditions. By locating a building specifically in a global location the software generates visual reports that describe how well the building will perform according to carbon emissions, natural and artificial lighting, thermal loss and ventilation, environmental pollution and building regulatory compliance. However, the only mention of people in these design and planning tools remains evacuation modelling, which simulates the likely behaviour of individuals caught in a fire.

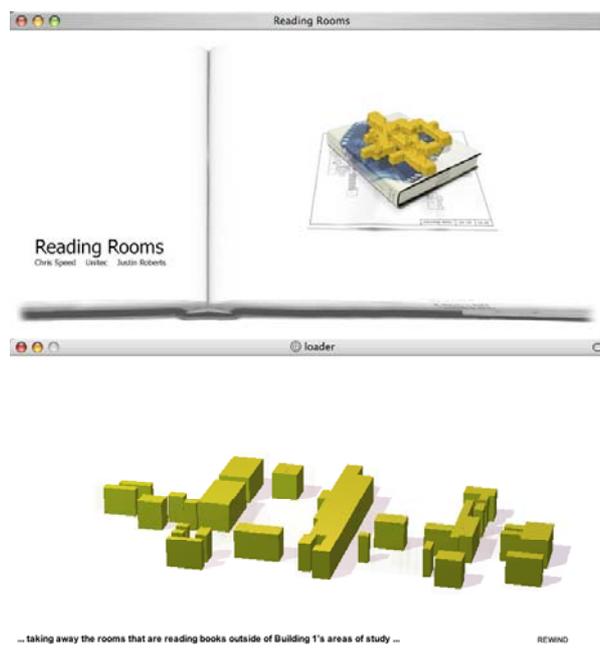
## 5. Practical Implementation

The technologies for new forms of software to integrate social data into digital architecture are already available through the use of networked databases. The process through which the architecture can be contested and transformed is outlined in the following two projects developed by the author; Reading Rooms and Invisible Transmissions.

### 5.1. READING ROOMS

The 'Reading Rooms' software was developed by the author while carrying out an artist's residency at Unitec, Auckland, New Zealand in 2002. The software used 'live' 3D animation to rebuild the architecture of the Design Faculty according to what students were borrowing from the campus library (Figure 1). By querying the university library's database and finding out what books a selection of students were borrowing, the software rearranged the layout of the buildings according to the subjects that the students were reading. For example, if an architecture student was reading a book about photography then a piece of the Architecture department would move to where Photography is based. This simple idea made it possible to see the trans-disciplinary nature of student study, the role that the library plays in facilitating the students' reading within and outside of their specialisms, and the multiple perceptions we have of a place and its architecture.

The Reading Rooms project attempted to identify the invisible relationships that bind and integrate the two components that make the design school at Unitec operate. These are the architecture of a converted 19th century psychiatric hospital, and the students who study art and design subjects in that location. The first element in this relationship could be understood to be a highly spatial, but temporally dumb component. The second element is far 'fuzzier' and can be understood to be subjects who embody tastes, opinions, politics and attitudes toward the fields of study they are taught within the school. Of the two components in the formula that made up how the occupants inhabit and live within its architectural spaces, the place is not seen as separate components. Architecture and people remain bound closely together through experience, which may break some of the 'rules of the space'. However, to the naked eye the relationship was still dominated by the physicality of the old hospital as it keeps educational programmes apart and hides any of the 'fuzziness' of the people who are studying behind its walls. The Reading Rooms project set out to try and find a way of unravelling the two components in order to identify how invisible exchanges between the two can be seen to affect each other.



*Figure 1.* Reading Rooms

In the case of Unitec's rigorous architecture and organic students, the author identified the Dewey library categorisation system as a means of 'contextualising' both a model that would describe the architectural layout

of the school from subject to subject, and offer space for the breadth and depth of what the students might be studying as they follow their programmes.

Simply by visiting the 100 rooms that made up the building and assigning a Dewey category to its taught subject; ie. Computer graphics 006 – 007 , interior design 747 – 750, it was possible to develop a spreadsheet that modelled the School of Design and the subjects that it taught. By asking an occupant of each room to provide the author with their library card ID number it was then possible to query the library database and find out the subject of the book they most recently borrowed from the library. To fulfil the visualisation of ‘invisible relations’ the author developed software that would model the movement of rooms within the school if each book represented a room on a plan. Consequently it was possible to see that students who were studying graphic design were actually reading books about photography, engineering students were reading books about postmodernism, and photography students were reading books about architecture.

The Reading Rooms project was a substantial breakthrough in demonstrating live, socio-spatial digital architectures. The indirect social navigation of students was found in the interrelations between the subject of the books that they borrowed, and became an implicit part of how the architecture was reconstructed. This construction of a socio-spatial architecture represents a critical demonstration of the use of social data to inform a digital architecture.

## 5.2. INVISIBLE TRANSMISSIONS

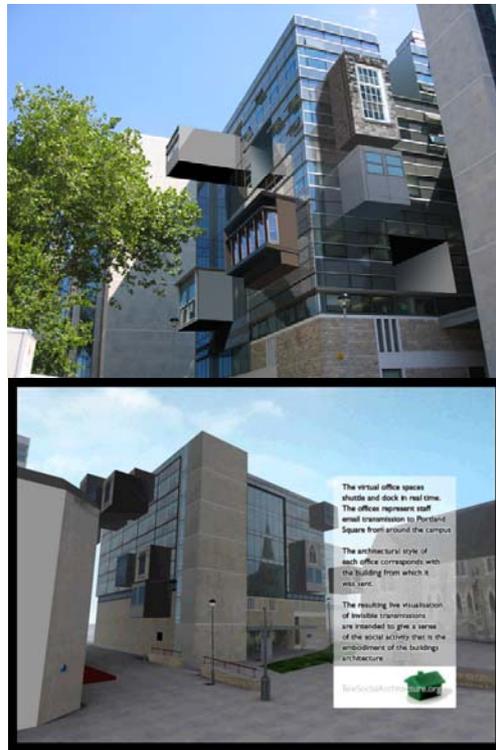
Following directly from the Reading Rooms, the author developed software to watch the reception of email communication between offices across the University of Plymouth campus.

A three-dimensional model of the Portland Square building was developed and the relevant rooms along the south flank of the building associated with the actual staff who occupied them. The software checked everybody’s email ‘inbox’ and established the names of recent people who have sent an email to the recipient. By correlating the sender’s name with their geographical location on the campus via the university telephone directory, an office with an image of the appropriate architectural style was then ‘flown’ into the scene and attached to the recipient’s office. The software checked inboxes every minute, so offices could be seen to be ‘flying’ into Portland Square and being absorbed into the building on a regular basis (Figure 2).

The resulting image of the buildings was one of collision and construction as individual offices were seen to attach themselves to the

exterior of the building in receipt of email. The live display of social activity was made visible to passers by through plasma displays in Atrias within the building. It could also be seen online, providing an insight into the live activity that the building and its business is substantiated upon.

The work was very effective at showing the invisible transmissions from around the campus to Portland Square, with many of the recipients watching the plasma screen or the online display. In an attempt to deal with the 'gods eye' projection that the Reading Rooms project used, the author used an eye-level perspective of Portland Square from the street. This decision was intended to extend the ocular norm that passers-by to Portland Square are used to.



*Figure 2. Invisible Transmissions.*

The live reconstruction of the building according to social communications was exciting, and at its busiest Portland Square became a different building as the alternative architectural styles interrupted the steel and glass exterior. There is much work to be done in improving the photo-real imagery to really contest the material nature of the architecture that is

seen by the eye, and this project demonstrated the extraordinary detail that will be required to do this. The work was presented in August 2006 at Siggraph as part of the arts panel 'Urban Landscape and Pervasive Technology Within Art' by Mike Salmond of Northern Illinois University, Hasan Elahi of Rutgers University and Mike Phillips of the University of Plymouth, and received positive feedback as an example of live data visualisation.

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