# Distinguishing Concepts
Lexicons of Interactive Art and Architecture

Interactive design has come about as a result of the intermingling of disciplines. As a consequence, the language it uses has become blurred – borrowed or stolen with little restraint from elsewhere. Though particular terms have become ubiquitous, the original concepts that lie behind them have been lost. This means that all too frequently they are no longer knowingly used. **Usman Haque** sorts the wheat from the chaff and brings clarity to bear on the vocabulary and thinking behind interactivity.
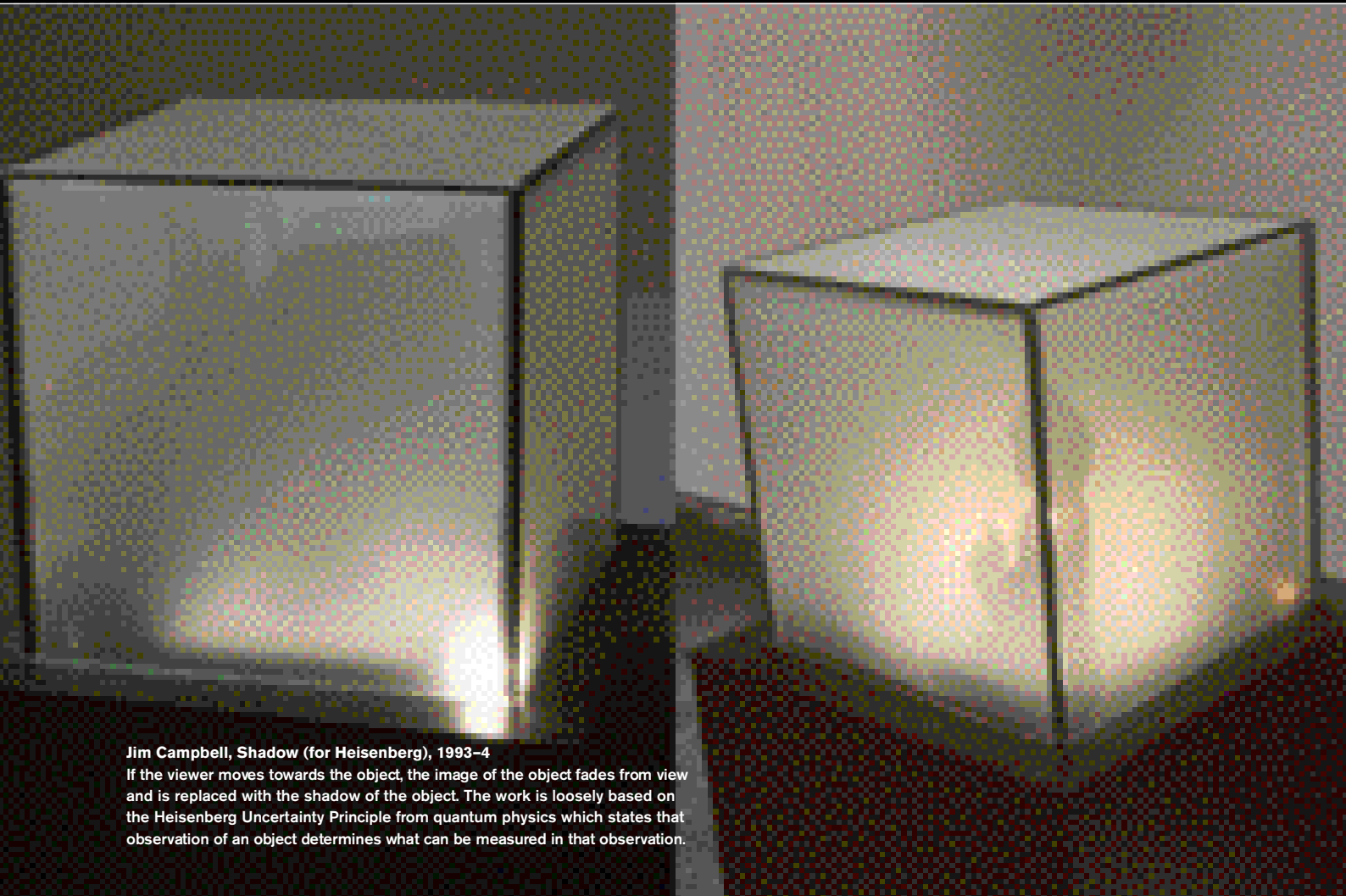
Jim Campbell, Shadow (for Heisenberg), 1993–4
If the viewer moves towards the object, the image of the object fades from view and is replaced with the shadow of the object. The work is loosely based on the Heisenberg Uncertainty Principle from quantum physics which states that observation of an object determines what can be measured in that observation.

One of the consequences of the last 50 years of Western philosophy is that we are more receptive to the notion that words are not directly constrained by physical objects and that definitions themselves are fluid, mutable and dependent on the observations of individual people.[1] Still, one way that the practice of art and the practice of science have been distinguished is by ascribing to the former a certain vagueness in the use of words, while the latter is said to be more intent on precision. Design (and by extension architecture), supposedly straddled between the two, struggles to retain connections to both types of practice because such hybridity is disingenuous, and this is reflected in its capricious terminology.

Even if one does not believe that such a distinction between art and science is useful, an attempt to be more precise with words in the field of design can be viewed as pseudo-scientific. Yet without this precision, design is dismissed as arbitrary and inconsistent. Architects are notorious for naively borrowing concepts from other disciplines,[2] while language frames the debates we have and guides us towards particular assumptions. Such phenomena are particularly evident in architecture simply because the intellectual aspect of the discipline depends to a large extent on language for its theoretical and cultural legitimacy: espoused in books, lectures, magazine descriptions and critiques.

This is particularly significant in an age where the use of technology is easily confused with the practice of art, the processes of research and design are increasingly intermingled, and the methodologies of interactive architecture are borrowing heavily from histories of interactive art.

The following text describes some common terms in the practice of interactive art and architecture, exploring the way such words have come to be used, and providing provocative counterpoints to these uses. This is not an attempt to return the true meaning to the terms under discussion. The concern here is that by wholeheartedly subscribing to the way such terms are now used, we are losing track of some of the most interesting concepts they originally offered us, which may hopefully help us conceive of further words and ideas in the future.
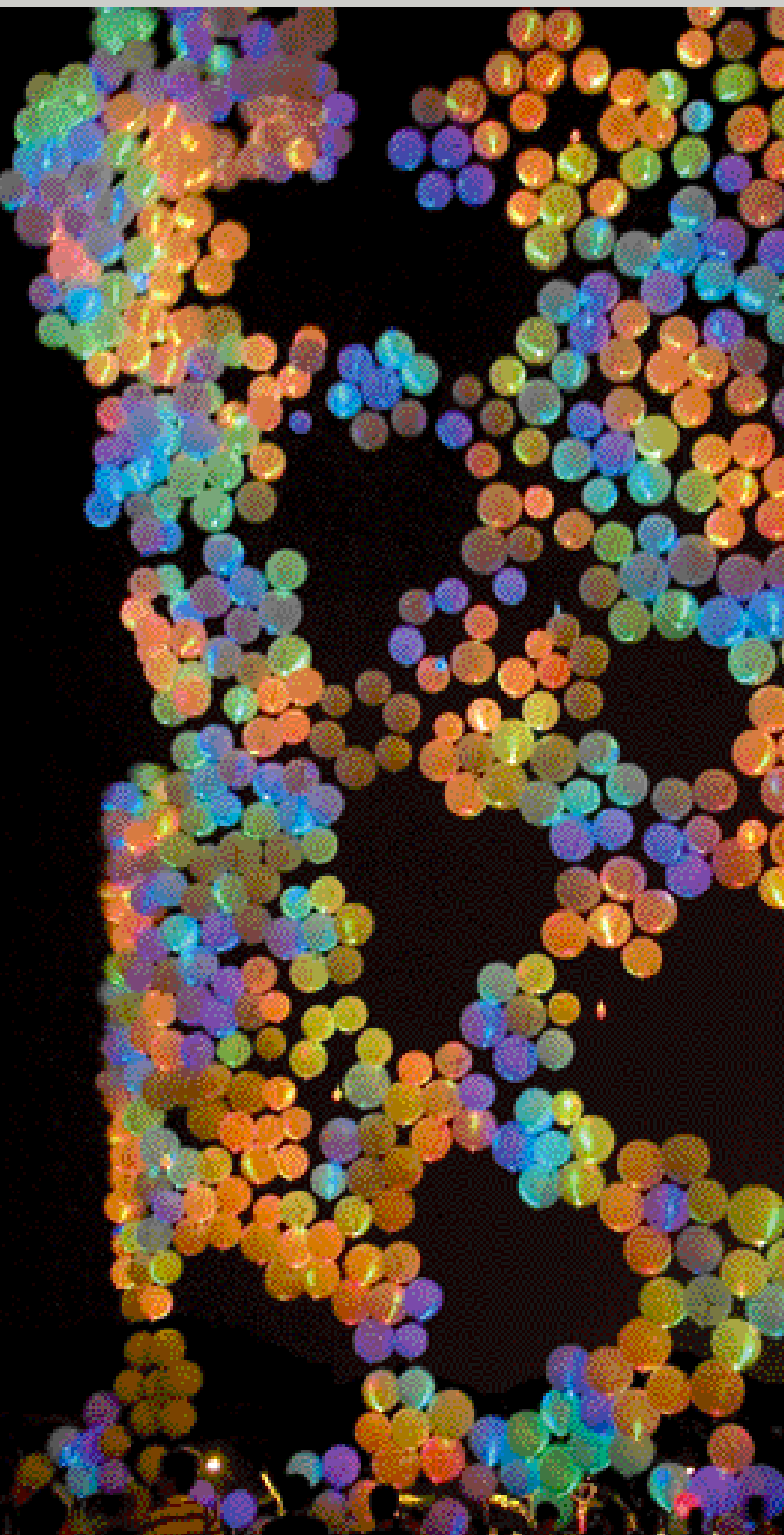
Usman Haque, Open Burble, Singapore Biennale, 2006
Participants design and construct the Burble on site. The form changes colour in response to the way that it is manipulated in real time by people holding on to the handrail down below. Their actions affect both the run-time response (changing colours) and how it responds to them (because it was they who determined the shape and configuration of the structure in the first place).

Interactive

It is often thought that the use of a dynamic/responsive system like a computer in itself enables an artwork, device or environment to open up to public participation and to be interactive. Actually, the rigidity of algorithms and input/output criteria usually employed in such systems means that they are just as autocratic as traditional media, time-based or otherwise.
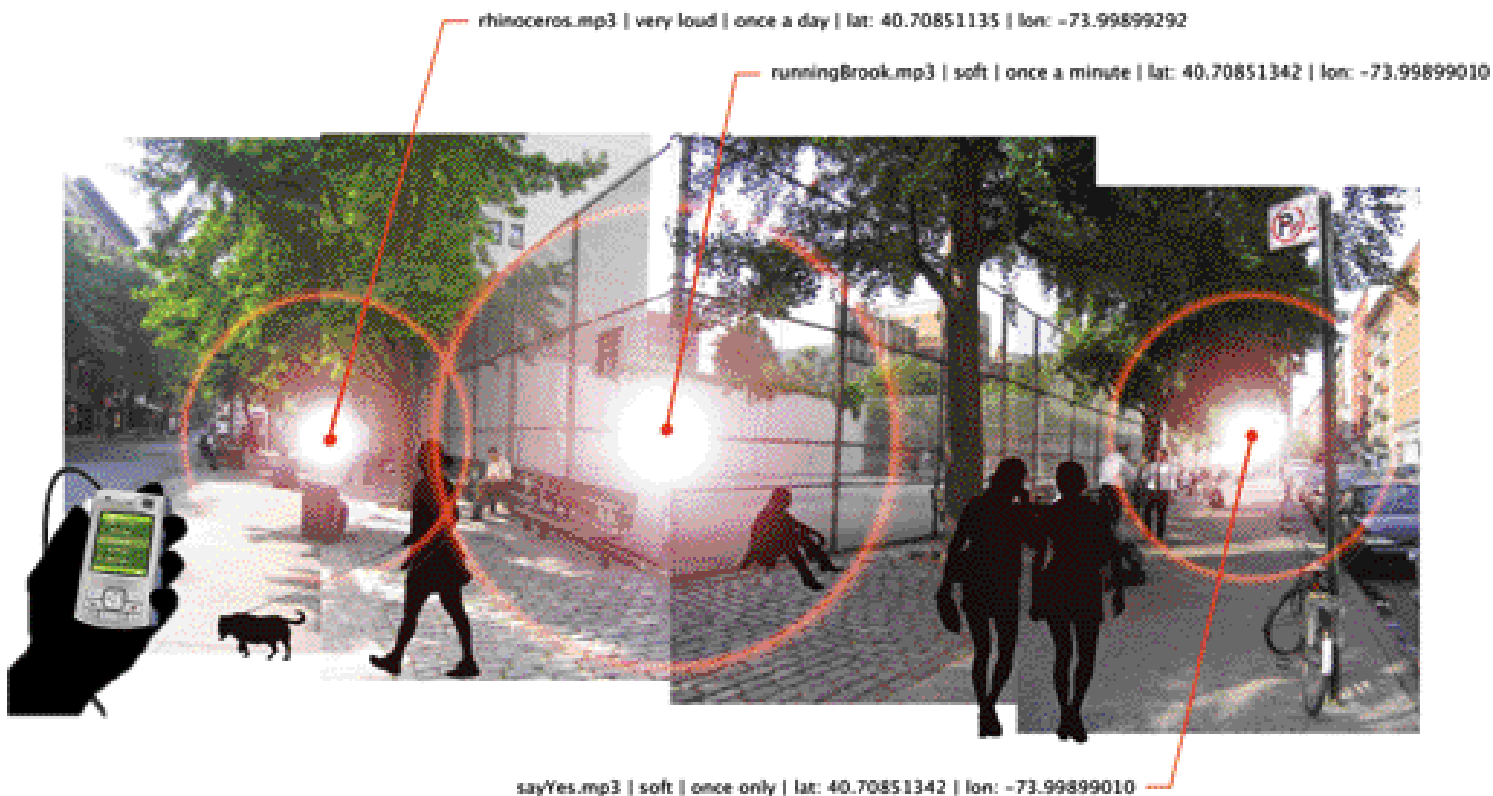
'Interactive' these days is used to describe everything from software to lighting to mobile devices, confounding in particular academic institutions[3] and the creators of award categories.[4] On the one hand it is claimed that 'all art is interactive'[5] (because each viewer constructs a personal experience of it), and on the other 'to call computer media interactive is meaningless - it simply means stating the most basic fact about computers'.[6]

Artist and engineer Jim Campbell has forthrightly called his engagingly sensual works 'reactive', which is appealing because the power of his work rests on its poetic nature.[7] These days, however, leading practitioners in the field of interactive art do use the word 'interactive' in the sense of 'responsive'.[8] Interactive art and architecture premised on the notion of an artefact doing something solely in linear-causal response to actions by a person (or environment) is generally structured on preprogrammed cycles of call-and-response between human and machine. Such work invokes a mutually reactive relationship only slightly more sophisticated than that between a person and an automated cash machine.

Though it has now come to refer to anything generally reactive or responsive, a few decades ago interactive described a very different concept. By obscuring the distinction between interactive and reactive we lose a potentially fertile conceptual framework.[9] Originally, interaction was distinguished from circular 'mutual reaction': it was about affecting not just actual output (in response to input) but also about affecting the way that output is calculated.

There is a marked difference between our relationship to a cash machine and our relationship to a human bank teller, with whom we are able to enter into a conversation (concerning some news item, or a particular financial issue that requires further discussion, or a personal matter once we get to know a teller from repeated visits to the bank). This is because both the input criteria (what we can say to the teller) and the output criteria (what the teller can tell us) are dynamic, and constructed collaboratively.

To expand on this further in the context of environments and architecture, consider the rather prosaic model of the thermostat, in which input criteria (the temperature dial) and output criteria (heat) are static and predetermined. An alternative interactive implementation (in the Paskian sense)[10] might enable a person to add inputs to the temperature-regulating system as desired. These could range from 'energy consumption for last month' to 'exterior temperature for this day last year', to 'colour of my clothes today' to 'fifth letter of the second paragraph on the front

rhinoceros.mp3 | very loud | once a day | lat: 40.70851135 | lon: -73.99899292

runningBrook.mp3 | soft | once a minute | lat: 40.70851342 | lon: -73.99899010

sayYes.mp3 | soft | once only | lat: 40.70851342 | lon: -73.99899010

Mark Shepard, Tactical Sound Garden Toolkit, 2006
An example of a constructionally interactive system where input/output criteria are determined by participants rather than the original designer. This open-source software platform enables anyone living within dense 802.11 wireless (WiFi) hot zones to install a sound garden for public use. Participants plant sounds within a positional audio environment using a WiFi-enabled mobile device (PDA, laptop or mobile phone), and wearing headphones connected to a WiFi-enabled device people can drift though these virtual sound gardens as they move throughout the city.

page of today's newspaper'. The system would evolve weightings for each of these input criteria in order to provide satisfactory output, again according to criteria determined in concert with each particular person.

Output criteria might include 'increasing thermal comfort', 'keeping my energy bills down', 'keeping my neighbour's energy bills down', 'minimising my hot-chocolate drinking' or 'maximising the number of friends who come to visit'. The system measures the input criteria and evolves ways to act on the basis of these to produce the most appropriate output (measured according to the output criteria). Interaction, in this older sense, arises because a person is able dynamically to affect the input and output criteria *and* how they are processed. Each of the interactors (human and machine) is able to act directly upon the other. The person has an effect not just on the outcome, but on how the outcome is computed (because even the input/output criteria are not predetermined).

Crucially, in this notion of interactive, both input and output criteria are underspecified by the designer. Instead they are actively and iteratively constructed by other participants of the project, and a more productive relationship ensues between human and environment in an approach not unlike Web 2.0 applications such as Wikipedia. It is this constructional notion that is lost when we are content to call interactive those things that are merely reactive.
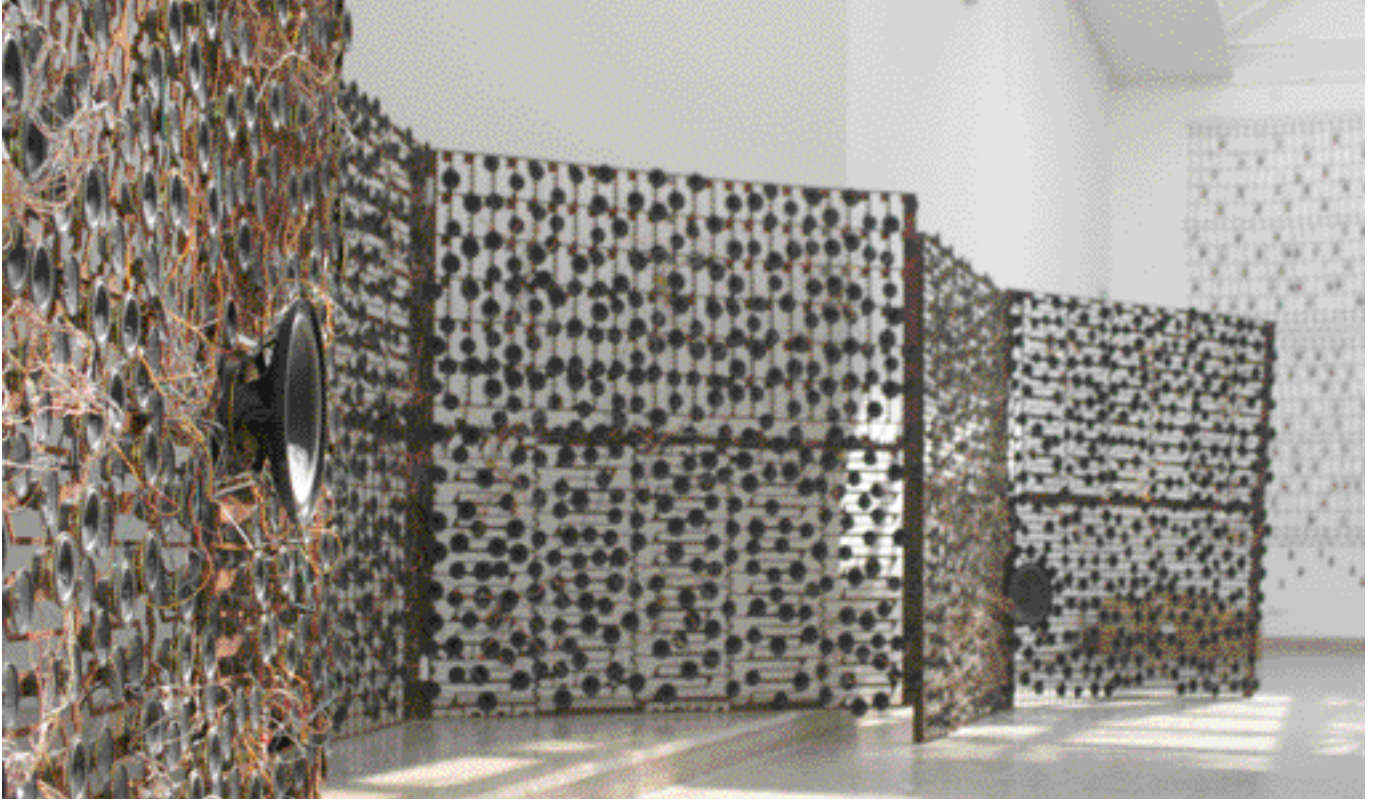
Open Source
Several conceptual bifurcations have occurred within the term 'open source'. Originally ascribed purely to the licensing of software, the phrase is now used to describe all sorts of cultural production.

In the software universe, open source refers to a type of source code, with which software is designed and built, that is accessible or viewable by all, freely distributed as long as it remains equally open, non-discriminatory and technology-neutral, that allows for modification and derivatives as long as the result is equally open, and where patching is possible without disturbing the integrity of the main work. Importantly, open source does not equate with lack of copyright or authorship: it comprises a licence that identifies potential usage, and where authors' contributions are recursively cited.

Several designers and researchers have been particularly interested in how these concepts might be applied to the field of architecture.[11] There are problems with such a translation, but it does seem that the collaborative means of production offered by an open-source approach might have much to contribute to a discipline that is known, particularly in the West, for its top-down authoritarian approach.

Regrettably, however, what was once regarded as primarily a method of production is gradually becoming instead centred around consumption. That is, where originally an open-source

Reorient team (installation coordinated by Adam Somlai-Fischer), Reorient migrating architectures, Hungarian Pavilion, Venice Biennale, 2006
Constructed by hacking low-tech toys and gadgets and controlled by open-source hardware and software platform Arduino/Processing, the pavilion emphasises both the idea of 'borrowing' from inexpensive toys made in China, and 'sharing' by demystifying the technology and providing Web documents (www.reorient.hu and lowtech.propositions.org.uk) and a catalogue manual for others to build their own responsive systems through low-tech components.

approach was an encouragement to share, it is these days increasingly used to account for the act of borrowing. As an example of the inversion in architecture of the productive features of open source, Ole Bouman, editor-in-chief of *Volume*, suggested at the 'Game Set and Match II' conference in Delft in 2006 that architecture has long been open source because buildings have always been constructed by borrowing technology and techniques developed by other designers and disciplines.[12] Bouman described an open-source society as one 'where everybody grabs what they can'[13] and portrayed the magazine *Archis* as open source because it redistributed recipes taken from the Internet within its pages.

This idea of open source forces us to be content with the self-indulgent state of current practice, but diverts us from exploring a radically different means of architectural production, one that is explicitly designed for sharing with others – the most exciting notion behind open source in the first place. It also diverts from the possibility of an open-source architectural model in terms of constructing architectural environments that are themselves collaboratively (and iteratively) produced by people who inhabit a space.

The sharing idea of open source (within the field of architecture) is, however, being expanded in more concrete terms by, for example, Architecture for Humanity's Open Architecture Network, and Open Source Architecture for Africa (www.osafa.org), both of which are collectively constructed databases of freely available architectural design tools and projects. Taking a slightly different tack, Linden Research Inc, provider of massively popular virtual world

Second Life, recently announced that the code for its software will now be freely available under a General Public Licence, enabling anyone with requisite skills to modify the code. As cultural commentator Cory Doctorow said in announcing this news: 'Customers only ever get to love it or leave it. Citizens get to change it.'[14]

The User
One concept in the field of human–computer interaction (HCI) that has become omnipresent is the term 'the user'. Over the last 15 years there has been a marked growth in concerns for

Center for Knowledge Societies (CKS), Used In India – Media Practices from the 20th Century, 2004
Extract from a CKS publication indicating some of the ethnographic analysis undertaken.

Maki Ueda, Hole in the Earth, 2004
Hole in the Earth linked Rotterdam in the Netherlands with Bandung in Indonesia by creating a video 'hole' in the planet through which people could see and hear each other in real time. The poetic nature of the installation makes this far more than a mere user-oriented video-conference system.

First, concentrating on a user or occupant often stresses the distinction between production and use and emphasises the distance between them. Second, by taking the minimum-common-denominator approach it may preclude the challenge of people learning a new skill that might open up new informational or constructional possibilities. These two factors encourage the notion of design as problem-solving (that is, the designer talks to a group of people, identifies the problems they are having and then develops a solution for them), but discourages users from proactively operating in an authentically productive capacity, potentially learning to help themselves.

This somewhat functionalist approach contrasts with the notion of design as a way to imagine and construct new ways of thinking as architects Constant Nieuwenhuis and Cedric Price were able to.[17] A particularly evocative solution to this is offered by Anne Galloway, lecturer in the Department of Sociology and Anthropology at Carleton University, and Alan Munro, research fellow in the Computer and Information Science Department at the University of Strathclyde, in their concept of 'interruption design ... that does not encourage straightforward and seamless interaction with devices ... that 'interrupts' strict notions of efficiency and usability.'[18]

Public and Private vs the Commons

Much interactive art and architecture is predicated on utopian distinctions between public and private space. Frequently sited outdoors, between buildings, in lobbies, parks and town squares, such work is said to be operating in the public sphere. Yet, the very land that such projects occupy is almost always under the dominion of a larger institution, whether it be governmental, academic or corporate.

Such areas of urban space, which carry the implication of belonging to an idealised general public, are in fact owned by these institutions and are subject to severe restrictions on the kinds of activities that can take place within their boundaries. Public space, a politely bland concept, always seeks to limit access to particular members of a community and/or selective groups of citizens, genders, behaviours or income groups.[19]

Meanwhile, the nostalgic notion of private space as a sanctuary is also fast eroding in the glare of corporations and governments using infiltration technology. Ever more detailed information about us leaks out of buildings, seeps out of our devices and is accessible to anyone with the appropriate bit of hardware or software. The data that portray our lives and lifestyles are accessible by so many individuals and organisations that they can no longer claim to lie in some private domain. Our spaces, physical and digital, are no longer exclusively our own.

Now that public and private spaces have become for many purposes indistinguishable, it may be useful to consider an older term, one that aspired to enable rather than restrict. Somewhere between the two illusory bait-and-switch concepts of public and private is a notion of space that thrives on paradox and contradiction rather than one

a design approach that is more conscious and considerate of the end user. This has been manifested in a greater desire for collaborative consultation with end users and has also resulted in a more sophisticated ethnographic approach to design. Some of the most interesting work in this area has been carried out by Aditya Dev Sood at the Centre for Knowledge Societies (CKS) in India who works with 'users in emerging markets ... [to] conduct contextual research studies to help technology companies determine the kind of devices, interfaces, features, services and power needs these groups of users require',[15] and Jan Chipchase in the User Experience Group of Nokia Research in Japan[16] who runs user studies to develop new mobile applications.

User-centred design places greater emphasis during the design process on the actual requirements of a user. In a user-centred approach, designers observe or have conversations with potential customers, test their creations on people, and are able to evaluate how first-time users can intuitively interface with them. The focus is on adopting future users' original ways of thinking rather than forcing them to adopt or learn new procedures.

There are a couple of risks with predicating design on the notion of a user, and in the field of architecture these extend to the problems with considering people as mere occupants.

Usman Haque, Floatables, 2004
Jellyfish-like vessels drift around cities, creating temporary, ephemeral zones of privacy: an absence of phone calls, emails, sounds, smells and thermal patterns left behind by others. Through various electrical systems they are also able to prevent access of GPS devices, television broadcasts, wireless networks and other microwave emissions.

that seeks to smooth these over – this is the space originally known as the 'commons'.

In Roman times the commons existed as a third category, alongside public and private space. It is a space that is defined by the rights that people have within it rather than by the restrictions that are placed upon them: it is not structured around ownership, though the actual land of the commons might be owned by someone. In the struggle between individuals and organisations, the notion of the commons dropped out of favour.

Without being nostalgic, the idea of siting design work in the commons is far more rewarding than siting it in some restricted notion of public space. Positioning design work in geographic locations that are explicitly defined by the rights that are conferred upon people – difficult though such locations may be to find – enables a wider concept of the ways that people of all kinds might engage with such work. It is premised on the notion that all our design acts are political and that we operate in a social context.[20]

Of course the concept of the commons is not limited to geospatial location; it might also consist of the 'network commons'[21] or, as shown by the community growing around the Creative Commons Licence, the sphere of production and distribution itself.[22] Work in, on and around the commons explicitly rises to the challenge of collaborative design and it is the closest the design field can come to recognising how much of its production depends on the production of those that came before.

Further Distinctions
While 'interactive', 'open source', 'the user' and 'public and private' space are among the terms most commonly found in discussions about technology and architecture, there are of course others, and a similar exploration into these might encompass concepts behind terms such as 'technology', 'cybernetics', 'virtual' (vs 'real' – a dichotomy that is now as quaint as the 19th century's distinction between 'mind' and 'body'!),[23] 'interface', 'environment' and, of course, most complex of all, 'design' itself.

'Technology', for instance, is a usefully vague term that refers to the development of human artefacts. It is generally employed to describe recent developments (after all, it can be

argued that everything developed by humans was at some point considered technological) and therefore has inherently temporal and contextual connotations. In the design world, 'technology' has an implication of newness that precludes ubiquitous distribution; it is therefore worth remembering that to work explicitly with technology is to concentrate on those artefacts that are not yet available to all.

'Cybernetics', originally concerned with the study of control and communication in animals and machines (and by extension human beings and societies), is now used to describe anything vaguely techno-biological. This is due in part to William Gibson's seminal book *Neuromancer*, in which he coined the phrase 'cyberspace' to describe a 'consensual hallucination … a graphic representation of data abstracted from banks of every computer in the human system', and in which 'cybernetic implants' and a 'cybernetic spider' were a recurring feature. However, even before this book the term 'cybernetic' was used to denote anything vaguely sci-fi; see, for example, punk poet John Cooper Clarke referring to his alien lover's 'cybernetic fit of rage' in 1977.[24]

Clearly 'design', which operates at least partly in the cultural sphere, would only be hindered by the rigid application of definitions. Motivated as much by commercial concerns as functional and abstract obligations, design is a historical concept with very specific contextual meanings that have come to denote many things to many people. The practice of design has undergone a particularly dramatic change as it has transformed from the domain of individuals to the domain of teams, reflected in a transformation from the design of objects and environments to the design of systems of objects and environments. However, it is precisely because it thrives in a medium of ideas that it is important to consider more precisely how design is described and, equally, how it describes itself.

Again, the purpose of this exercise is not so much to pin down nostalgic meanings of words or to provide an authoritative reference guide, but rather demonstrate that there are some quite interesting and fertile conceptual frameworks in the field of interactive architectural design that can be obscured or revealed by the language we intuitively use. 𝝙

Notes
1 'Language frequently creates the illusion that ideas, concepts and even whole chunks of knowledge are transported from a speaker to a listener … rather each must abstract meanings, concepts and knowledge from his or own experience.' E Von Glasersfeld, 'Editor's Introduction' in *Radical Constructivism in Mathematics Education*, Kluwer (Dordrecht), 1991, pp xiii–xx.
2 For an alternative perspective on 'reappropriation' see architect Eyal Weizman's exploration of how the Israeli military adopts language and tactics of philosophers Deleuze and Guattari, traditionally reference material for artists, architects and cultural theorists. Eyal Weizman, 'The Art of War', *Frieze* 99, 2006, http://www.frieze.com/feature_single.asp?f=1165.
3 In London, the Royal College of Art has a department that has been through at least three names in the last seven years: Design Interactions, formerly known as Interaction design, formerly known as Computer-related design.
4 See, for example, Ars Electronica who, apparently believing that the 'Interactive' category was too restrictive, introduced an even more woolly 'Hybrid' category!
5 Roy Ascott, Director, CaiiA-STAR, University of Wales College Newport and University of Plymouth, suggested in an address at the Victoria & Albert Museum, London, in May 2002 that 'we recognize that all art is interactive now, whether the work consists in the static field of a painting or a dynamic system in cyberspace'. http://www.vam.ac.uk/files/file_upload/5766_file.pdf.
6 Lev Manovich, *The Language of New Media*, MIT Press (Cambridge, MA), 2001 .
7 See Campbell's exhibition entitled 'Reactive Works' at the San Jose Museum of Art, California, 1998.
8 'The standard definition of interactivity is something with feedback, where you trigger something and get a direct response' – Perry Hoberman, quoted in 'Loosen the loop', *Art Orbit* No 4, February 1999, http://artnode.se/artorbit/issue4/i_hoberman/i_hoberman.html. And 'An interactive system is a machine system which reacts in the moment, by virtue of automated reasoning based on data from its sensory apparatus', quoted in Simon Penny, 'From A to D and back again: The emerging aesthetics of Interactive Art', *Leonardo Electronic Almanac*, Vol 4, No 4, April 1996.
9 See, for example, the SAKI teaching system developed by Gordon Pask, who provides strict guidance on how to build interactive systems in a more structural sense. Gordon Pask, *An Approach to Cybernetics*, Harper & Brothers (New York), 1961; refer also to 'Paskian Environments: The Architectural Relevance of Gordon Pask' in this volume.
10 See 'Paskian Environments: The Architectural Relevance of Gordon Pask' in this volume for more on Gordon Pask and his work.
11 Brian Carroll, 'Open Source Architecture', http://www.nettime.org/Lists-Archives/nettime-bold-0006/msg00083.html; Usman Haque, 'Hardspace, Softspace and the possibilities of Open Source Architecture', http://www.haque.co.uk/papers/hardsp-softsp-open-so-arch.PDF; Dennis Kaspoori, 'A communism of ideas: towards an architectural open source practice', *Archis* No 3, 2003; Anand Bhatt, http://www.architexturez.net/; Ulrich Königs, 'Divercity', http://berlin.heimat.de/home/divercity/; Andrew Dribin, 'Copyleft Architecture', http://www.acadia.org/dde/D_055/01.html.
12 Author's notes; conference transcripts unavailable.
13 Ole Bouman, 'Open Source: Between the spirit of democracy and the law of the jungle', in proceedings of 'Game Set and Match II', TU Delft, 2006.
14 http://www.boingboing.net/2007/01/08/second_life_frees_so.html.
15 http://www.cks.in/.
16 http://www.janchipchase.com/.
17 See, for example, well-cited projects by the two: Constant's New Babylon and Price's Fun Palace.
18 Alan J Munro, Anne Galloway, Luke Skrebowski, Erik Sandelin and Simon B Larsen, 'Interruption Design: From Bovine Hordes to City Players', unpublished manuscript, 2004.
19 See, for example, the United States' use of Free Speech Zones to confine critics of authorities to ca refully controlled areas, implying that territory outside these zones does not in fact allow for free speech contrary to its own constitution.
20 See Anthony Iles, 'Of Lammas Land and Olympic Dreams', *Metamute*, January 2007, http://www.metamute.org/en/Of-Lammas-Land-and-Olympic-Dreams.
21 Armin Mendosch, 'Not Just Another Wireless Utopia: Developing the Social Protocols of Free Networking', http://rixc.lv/ram/en/public07.html; and Julian Priest, 'Pico Peering Agreements', http://informal.org.uk/people/julian/resources/picopeer/PPA-english.html.
22 See the Creative Commons Licence (http://creativecommons.org/) applied by makers of all sorts of things throughout the world in order to specify ways in which their work may be shared and distributed for the common good.
23 This observation is attributed to Stephen Gage, Professor of Innovative Technology at the Bartlett School of Architecture.
24 '(I married a) Monster from outer space', performance at the Electric Circus Club in Manchester on 2 October 1977, released on 10-inch vinyl short circuit: *Live at the Electric Circus*, VCL 5003.