Thinking beyond

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Abstract.

If the new generation of architects is in need of tools, then we can consider ourselves lucky. On the market there are as many CAD systems as we would be able to learn and use in more than a Curriculum of a School of Architecture. On the other hand, being able to use the tools doesn't mean being able to produce good designs. It's often pointed out how much buildings designed by CAD systems look strangely similar. In the challenge of education, in Schools of Architecture, we need to help students to think beyond the tools themselves. This can be done with, for example, Virtual Design Studios and MUDs/MOOs, in which students can practise their architectural skills and adapt the tools to their design, instead of vice versa. This paper is a description of some attempts in educating how to think beyond tools in design tasks.

1. Introduction.

In the course of study of Architecture, students often, but not always, come across CAD systems in one or more courses. The way they learn to use these tools is functional to a design assignment. After a (short) period of study of the brief, the student becomes particularly interested in how to take maximum advantage from the CAD and/or rendering system, in order to produce the best drawings, which seldom correspond to the best designs.

A school of Architecture chooses a couple among the several CAD systems, according to the actual platforms in the labs, and the preferences of the tutors. Some rendering packages complete and integrate the CAD ones. Then, the packages are introduced to the students as compulsory, to be used for the final presentation. Often, the integration of CAD and rendering systems is requested. Less often, a deeper understanding of the design process in the use of these tools is kept in consideration. The students start struggling with computers before understanding what is involved in the use of these tools: from presenting their designs in a full paper based form, they start learning to think with computer mediated tools, and often this means an initial discomfort about the technology introduced.

Recently, some tools for collaboration, such as the World Wide Web, videoconference and mailing lists, are being introduced to facilitate the communication among the students, and between the students and the coordinators, as in the Virtual Design Studios (VDS). (Bridges, 1995; Cicognani, 1995; Maher and Saad, 1995; Wojtowicz, 1995)

Moreover Multi User Dungeons or Dimensions (MUDs) are being discovered as a powerful tool for collaboration, and construction of virtual collaborative environments. (Bruckman and Resnick, 1995a; Bruckman and Resnick, 1995b; Cicognani, 1996a; Cicognani, 1996b)

At the basis of the use of computer mediated collaborative tools (CMCT), there is a major obstacle to be considered and overtaken: the “thinking beyond” process. This expression

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indicates the necessity to wear a linguistic habit which underlies the use of the tools themselves. The students, and other users of CMCT, have to practise the linguistic habit of approaching a design problem.

Design is a linguistic process, not only in the sense of the negotiation involved, but in the sense of metaphorically explaining and modelling the design brief into a series of instructions, which give the capacity to anybody to observe and criticise our interpretation of the design brief.

Some linguistic theories, such as the speech act theory (Austin, 1962; Searle, 1969; Searle, 1971; Searle and others, 1980, have been introduced in the thinking process related to computer tools and systems. (Auramaki and others, 1988; Winograd, 1983; Winograd, 1987; Winograd, 1988; Winograd, 1996)

This paper will explore how a linguistic approach to computer mediated design tools can help to think beyond the tools themselves.

2. Computer Mediated Collaborative Tools in a Virtual Design Studio.

During the experience of Virtual Design Studios, it has been possible to notice different approaches toward the presented collaborative tools. Following are some observations on how synchronous and asynchronous tools have been used and exploited by VDS students. (cf. Maher and Saad, 1995; Maher and others, 1996; Rodden, 1993)

2.1 Videoconference via Internet

It represents a synchronous collaborative tool. The videoconference session has to be negotiated and scheduled some time before, and it requires some patience by the participants in coping with technical problems.

This tool is usually quite appealing, for its capacity of engaging into visual aspects of collaboration, and it gives the participant a better and closer view of the remote counterpart. Often, communication problems force participants to use a chat window or the telephone, if the purpose of the session requires a higher and faster quality of communication.

Videoconference has been experienced as a quite frustrating tool, and often not completely satisfactory for its communication scopes. Nevertheless, it seems to be relevant for establishing a visual contact, and certainly irreplaceable for the collaboration in both short and long term.

2.2 World Wide Web

This asynchronous tool is easily approached and used by the students. The Web browsers do not require a particular knowledge of Internet and its structure. Some basic information can be given in a couple of lectures, focussed on publishing on the Web for the purpose of the Studio.

Learning the basics of HyperText Markup Language (HTML) has been observed to take not more than two weeks; the image processing phase takes about one week before the

students feel comfortable. In general, publishing on this medium has been found quite easy and satisfying by the students.

We have invited the students to use the World Wide Web both for publishing and retrieving/linking information. Creating a network of references has the advantage of keeping open the eclecticism of the student, avoiding the fixation onto particular patterns and stimulating the creativity of publishing.

2.3 HyperMail, CAD and other Internet tools

HyperMail is a mail tool which allows users to post and read email messages from the Web. We asked the students and the VDS client to use this tool for their communication, so that we could monitor their activity. An alias referring to a mailing list has been made available, and the HyperMail Web page was the common place for checking questions and answers.

CAD and packages had been taught separately, and many of the students already had a sufficient knowledge of them to be able to produce satisfactory models. The students who didn't have any knowledge of 3D modelling software have been allowed to draw on paper and to scan the drawings to be put on the Web. However, nothing in the final presentations of the Studios has been presented on paper.

Other Internet tools, such as IRC, talk, FTP and Telnet, have been introduced but not used. In fact, they didn't offer more than videoconference, HyperMail and the Web did, and the students found these tools less friendly and interesting.

The above tools covered almost all the needs of communication. In most cases, the coordinators had to force the students to use them, even after a training period, in which the students were freely responsible for getting to know the tools. In some cases, when time was short or the technical difficulties too many, students readdressed their efforts to mixed techniques of hand-drawing and scanning, and "In Real Life" communication and presentations. This was called "hybrid" communication, in which, in order to reach the requested computer based presentation, the students used mixed techniques of designing, drawing and communicating.

The capacity of the coordinators to maintain and protect remoteness gives a better chance for CMCT to be successful. The frustration coming from the technical difficulties has to be presented as part of the experiment, and the technical solutions must be understood as challenges for students and coordinators. The participants should be encouraged to refer to and use the technical tools introduced, even when they seem to create further complexity. The issue of training plays a major role in the success of CMCT.

3. Synchronous and asynchronous communication: potentials and limitations.

Computer support for collaborative design is still in the early stages of development. The technology available for sharing and communicating information across computer networks

appears to be readily available and relatively easy to use. Most universities teach and encourage the use of CAD and, more recently, the use of Internet for communication and shared information. The design studio should be the real beneficiaries of this technology, where the development of the design models and documents is essential for communication of design ideas.

Using technology in a design environment brings the complexity both of the way information is communicated and of the design process to respond to a brief. Sometimes, the incompatibility of computer software and packages plays a major role in how the collaboration can be successfully completed. The Schools of Architecture, sometimes less than professionals, have only a few tools available, and they seems not to focus enough onto how to integrate these tools with the classic teaching of design.

Establishing a Virtual Design Studio requires the integration of heterogeneous environments. Sharing CAD files is possible when the same CAD system is used in different studios, or when a standard representation is supported by different CAD systems. HTML and the Web can partially cover this lack of standard and have represented the only possibility for the students to exchange information.

Informal design content, in the form of text and images, can be shared across long distances when the information is placed on the WWW. Groupware applications support information and application sharing through multi-user interfaces. Examples of Groupware applications are shared drawing programs, talk programs, shared diaries, and video conferencing.

In a VDS two kinds of communication are involved: synchronous and asynchronous. In the synchronous communication, the sender(s) and the recipient(s) of the message have to be connected, at the same time, with the same tools. A kind of "physical" presence has to be noticed: if we want our communication to be received, the simultaneous use of the same channel has to be satisfied and satisfying. Examples of synchronous communication tools are chat channels, videoconferencing systems, sharing tools and, more in general, computer mediated meetings. The advantages of synchronous communication are in the direct interaction of the two parties, who can check and respond in real time on the object of collaboration.

In many cases, during VDS sessions, there have been problems with the quality of the synchronous channels, and/or the presence of the recipient(s). These problems caused some intolerance and unease in the participants, who in many cases, started losing confidence in the reliability of the technology used.

Asynchronous communication does not rely on the online presence of the recipient. Instead, it presents a time delayed characteristic which allows an accessibility of the information left on that resource that is not constrained by time. Students were asked to use email, automatically published on the Web via HyperMail, to consult and interrogate the client. Moreover, the WWW was the only channel through which the students could present the information collected.

Asynchronous tools were provided to supply the communication which was permanently and continuously accessible. The use of email, in a Web-based form such as HyperMail, the use of the World Wide Web (WWW) and the use of mailing lists were provided.

We have not been able to understand the main issue which refrained the students from using the collaborative tools exclusively. In fact, students still asked for a substantial physical presence, and didn't accept the full remoteness proposed at the beginning of the Studio. We recognise a learning curve which, in spite of the user friendly interfaces of the tools, still is not acceptable by students trained with classic tools for design. A more extended time for practising the tools should be allowed. We think that the learning curve for the collaborative tools is acceptable when dealing with the single tool. Instead, the learning curve of collaboration on a computer mediated environment seems to have unexpected complexity.

4. Virtual Communities, MUDs and MOOs as tools for collaboration and design.

A Virtual Community (VC) is, namely, a community which exists thanks to computer mediated communication technologies. With virtual communities, we intend both spontaneous and non spontaneous communities, regulated or not by one or more mediators with superior possibilities of affecting the community, populating the electronic space. For instance, the community of IRC (Internet Relay Chat), a real time chatting system over Internet, or MUDs (Multi User Dungeons) and MOOs (MUDs Object Oriented), places in which characters (players) interact synchronously and asynchronously are to be considered examples of virtual communities (VC).

The issues involved in the evolution, construction and perception of cyberspace, the space where a VC dwells, find a starting point from the evolution, construction and perception of space. “Virtuality”, for instance, implies an alternative status of awakeness, particularly related to electronic communications (and perceptions) (cf. Cicognani, 1994; Leary, 1994). The analogies used in describing the electronic space are arguably immature, considering the potential of new technologies for communication. The metaphors and analogies used in the text based communities that dwell in the electronic space can be compared to the first use of steel, rather than bricks, in building bridges: the grammar of steel was still reflecting the grammar of bricks. Only after a period of research and development, steel has been able to find its own grammar, syntax and semantics.

Designing “physical” space is the task of architects. Space and its perception are notions that architects are familiar with, as well as the technical aspects of its edification. Operating inside cyberspace involves the notion of space, language and the technical possibilities of the programming language, and the limits we might face for its construction. Architects are better qualified to understand the notion of space and to find a model for its construction.

MOO language may be considered as an example of how technical, linguistic and design issues overlap on the definition of space. The description of the virtual space as well as the macro commands to build it as well as the programming language, identify the possibilities and limits of designing in cyberspace. The advantage of operating in a MOO is that the object carries the perception that the designer wanted to attribute to it. The description of the

design, and the possible actions which can be performed with that object, in that room, are all part of the design.

MUDs and MOOs can be considered powerful collaborative tools, for they give the possibility to create computer based and mediated communities, and to gather “virtual citizens” who can be designers of their own space. (Bartle, 1990; Carlstrom, 1992; Curtis, 1992; Curtis and Nichols, 1993; Dibbell, 1993; Reid, 1994; Reid, 1991; Rosenberg, 1992; Serpentelli, 1992)

5. Thinking beyond in Virtual Communities.

What is meant with “thinking beyond” is the possibility of sidestepping the technical difficulties of the tools used and approaching a design problem beside and above them. We argue that language is the metaphorical system we adopt for the construction of understanding, and therefore reality, (cf. Austin, 1962; Reddy, 1979; Searle, 1971; Searle and others, 1980; Wittgenstein, 1921; Wittgenstein, 1953), and that language is the building material of cyberspace. (Cicognani, 1996b)

We will consider design in a computer mediated collaborative environment as a linguistic problem. First of all, design can be considered for its nature of “defining” a field of influence (which means naming the object of its exercise). The linguistic definition of the area of design is part of the solution of the design brief. Moreover, the brief itself is supposed to visualise that preliminary part of the design which is going to be graphically described.

Then, in a computer mediated environment, it becomes a linguistic question how the brief is resolved: which software tools are used, which kind of computer mediated communication between the designer and the client is required to reach the fulfilment of the design properties, how the final graphical and verbal description of the design will allow the builder to execute the project, and on which medium it is going to be presented.

Some tools, better than others, reflect these requirements. Videoconference and shareboards, for instance, include the possibility of online video and synchronous communication tools, which support graphics and typing. They seem to respond quite well to general designers’ necessities of brainstorming on a design problem, but they often seem to lack qualities of the “In Real Life” collaboration, and the precision of hand drawings. We will not enter into the details of how much and which tools are more appropriate for design collaboration, for the purpose of this paper is to point out how language can be useful to the resolution of design problems, in computer mediated environments.

From some examples of existing VCs (ie: LambdaMOO and experimental StudioMOO), we discovered how language is functional to design in such spaces. Speech acts with design characteristics, in the form of macros, performed in a MOO, can be regarded almost always as “performative” in the sense that they actually modify the environment with the force of the utterance. (Austin, 1963) For instance, if we type: “@dig kitchen”, which corresponds to “make a room called ‘kitchen’”, we will have pronounced a sentence which has modified the MOO environment, having added a new room.

The example above is a “thinking beyond” one, for it takes a linguistic approach to a design problem, without entering in the details of the tool. We may say that the design

grammar engaged in this exercise is of a linguistic kind, and not yet of a shape kind. The description of the design forms the design itself, and a VC is to be considered a place in which any objects is language based and designed, and reflects its linguistic characteristics.

MOOs are only examples of how technology behind cyberspace can be observed as design tools. In general, virtual communities are based on a specific communication characteristic: the World Wide Web, Internet Relay Chat, Newsgroups or intranets. Moreover, CAD systems and related packages can form online communities which dialogue through the same design language. In the electronic world, the dependency on a protocol (either of communication or of graphic performance) has to be set and respected. The way of overtaking the difficulty of dialogue between protocols and standards is to face the design problem as a linguistic one, in order to reflect on the linguistic syntax before entering the details of its representation.

6. Conclusions and discussion.

From Virtual Design Studios to Multi User Dungeons to World Wide Web sites, cyberspace has become a privileged place for collaboration. Tools and protocols for exchanging information, data files and communication, are available and recommended. Various Internet tools are able to support and encourage a better collaboration among designers, especially students of architecture.

However, CAD tools may considerably absorb the energy of coordinators and students into resolving technical and learning problems. It is often the case that the focus of computer based design studios becomes the solution of these technical problems, rather than remaining focussed onto the design issue.

Tools for “thinking beyond”, then, have to be taught, not only to limit the impact of technical difficulties, but also to revalue the design process in its specific linguistic components. One of these tools can be to consider the design problem as a linguistic one, where the definition of the problem can be developed inside a language based system, such as a MOO. In this way, students are invited to experience linguistically something that they will later experience graphically. “Doing things with words” becomes feasible and easy in MUDs and MOOs. MOOs also reflect the object oriented programming characteristic, which can be assimilated to some grammatical properties of language, and can be helpful in the definition of single entities and in the reference to syntax, semantics and pragmatic.

Yet, a satisfactory study of how speech acts (performative statements) can be developed in a MOO has to be put together. It is arguable that a design language for a MOO could be one of the best solutions for students and teachers to face a design problem. However, cyberspace has a linguistic basis which can be used in the development of a particular tool for design.

We understand and support the big potential that language has in the construction, design and use of electronic space. Designing of cyberspace is to be differentiated from designing in cyberspace. The former can be expressed with software, interfaces and computer based editors; the latter must deal with a linguistic approach and structuring of the design possibilities allowed by new technologies for communication.

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References.

Auramaki, E., E. Lehtinen and K. Lyytinen. "A speech-act based office modelling approach." *ACM Transactions on Office Information Systems* **6** (1988): pp.126-152.

Austin, John L. *How to do things with words*. Boston: Harvard University Press, 1962.

Austin, John L. "Performative-Constative." In *Philosophy and Ordinary Language*. pp.22-23. Edited by Charles E. Caton, Urbana: University of Illinois Press, 1963.

Bartle, Richard. *Interactive Multi-User Computer Games*. Electronic text: 1990. ftp://parcftp.xerox.com./pub/MOO/papers/mudreport.txt.

Bridges, Alan. "Design Precedents for Virtual Worlds." In *The Global Design Studio, CAAD Futures*, Conference Proceedings, Singapore, edited by Milton Tan and Robert Teh, CASA, 293-302, 24-26 September 1995.

Bruckman, Amy and Mitchel Resnick. "The MediaMOO Project: Constructionism and Professional Community." *Convergence* **1** (1 1995a):

Bruckman, Amy and Mitchel Resnick. *Virtual Professional Community: Results from the MediaMOO Project*. Electronic text: 1995b. http://black.missouri.edu/~wleric/Bruckman-MediaMOO.html.

Carlstrom, Eva-Lise. *Better living through language. The Communicatiove Implications of a Text-Only Virtual Environment or, Welcome to LambdaMOO!* Electronic text: 1992. ftp://parcftp.xerox.com./pub/MOO/papers/communicative.txt.

Cicognani, Anna. *Verso una nuova virtualità. L'uomo, l'artificiale e la tecnologia.* Graduation thesis, Politecnico di Milano, Facoltà di Architettura, 1994.

Cicognani, Anna. "The New Challenge of Learning." In *Multimedia and Architectural Discipline, ECAADE*, Conference Proceedings, Palermo, edited by Benedetto Colajanni and Giuseppe Pellitteri, Dipartimento di Progetto e Costruzione Edilizia, pp. 37-42, 16-18 November 1995.

Cicognani, Anna. *Designing Space with Technologies for Networked Communication*. Ph.D. Thesis Proposal, University of Sydney, Faculty of Architecture, 1996a.

Cicognani, Anna. "Which language for cyberspace?" University of Sydney, Faculty of Architecture: Working paper

Curtis, Pavel. "Mudding: Social Phenomena in Text-Based Virtual Realities." In *DIAC 1992*, Conference Proceedings, 1992.

Curtis, Pavel and David A. Nichols. *MUDs grow up: Social Virtual Reality in the Real World*. Electronic text: 1993. ftp://parcftp.xerox.com./pub/MOO/papers/MUDsGrowUp.txt.

Dibbell, Julian. "A Rape in Cyberspace." *The Village Voice* **21 December** (1993): pp.36-42.

Leary, Timothy. *Chaos and Cyberculture*. Berkeley: Ronin Publishing Inc., 1994.

Maher, Mary Lou and Milad Saad. "The Experience of Virtual Design Studios at the University of Sydney." In *ANNZAScA*, Conference Proceedings, University of Canberra, October 1995.

Maher, Mary Lou, Simeon Simoff and Anna Cicognani. *The Potential and Current Limitations in a Virtual Design Studio*. Electronic text: 1996. http://www.arch.su.edu.au/~mary/VDSjournal.

Reddy, Michael J. "The Conduit metaphor." In *Metaphor and thought.* pp.164-201. Edited by Andrew Ortony, 2 ed., Cambridge: Cambridge University Press, 1979.

Reid, Elizabeth. *Cultural Formations in text-based Virtual Realities*. Master Thesis, Dept. of English, University of Melbourne, 1994.

Reid, Elizabeth M. *Electropolis. Communication and Community on Internet Relay Chat*. Honour Thesis, Dept. of History, University of Melbourne, 1991.

Rodden, T. "Technological Support for Cooperation." In *CSCW in Practice: An Introduction and Case Studies*. pp.1-22. Edited by Dan Diaper and Colston Sanger, London: Springer-Verlag, 1993.

Rosenberg, Michael R. *Virtual Reality: Reflections of life, Dreams, and Technology. An Ethnography of a Computer Society*. Electronic text: 1992. ftp://parcftp.xerox.com./pub/MOO/papers/ethnography.txt.

Searle, John R. *Speech acts: an essay in the philosophy of language*. London: Cambridge University Press, 1969.

Searle, John R. *The philosophy of language*. London: Oxford University Press, 1971.

Searle, John R., Ferenc Kiefer and Manfred Bierwisch, edited by. *Speech act theory and pragmatics*. Synthese language library. Dordrecht, Holland: D. Reidel, 1980.

Serpentelli, Jill. *Conversational Structure and Personality Correlates of Electronic Communication*. Electronic text: 1992. ftp://parcftp.xerox.com./pub/MOO/papers/conv-structure.txt.

Winograd, Terry. *Language as a cognitive process*. #1. Reading: Addison Wesley Pub. Co., 1983.

Winograd, Terry. *Understanding computers and cognition : a new foundation for design*. #1. Sydney: Addison Wesley Pub. Co., 1987.

Winograd, T. "Where the Action is." *Byte* (December 1988): pp.256-258.

Winograd, Terry. *Bringing design to software*. Reading: Addison Wesley Pub. Co., 1996.

Wittgenstein, Ludwig. *Tractatus Logico-Philosophicus*. London: Routledge & Kegan Paul, 1921.

Wittgenstein, Ludwig. *Philosophical investigations*. Transl. by G.E.M. Anscombe, Oxford: Basil Blackwell, 1953.

Wojtowicz, Jerzy, edited by. *The Virtual Design Studio Book*. Hong Kong: Hong Kong University Press, 1995.