IMAGINING THE IDEAL DESIGN STUDIO: TECHNOLOGY, PEOPLE AND ENVIRONMENT IN ARCHITECTURAL EDUCATION

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Keywords
Interactive Architectural Education, Design Studio, Computer Technology and People- environment.

Abstract
Architectural education is strongly related to technology and people-environment. While architecture has its own history and traditions, new knowledge is incorporated from other fields such as the basic sciences and engineering, behavioral sciences and the humanities. This paper refers to an ideal study which aims to integrate a range of computer-based multimedia technologies. This ideal study has the overall goal of enhancing the processes of architectural education in the design studio.

In case of the design process, the development of advanced design systems has a twofold role, to provide for design students, with experience and understanding of the role of advanced design systems in the architectural education. Architectural design must meet a wide range of design objectives. Each objective has its own technological, people- environmental, social, economic and other requirements, and each has been the subject of intensive study, and even specialization. These individual objectives, however, are not independent of each other. Our paper asserts that they are combined in an ideal design studio imagination of the built environment and design decisions that are intended to meet one objective in an interactive design studio of the future. As we approach the 21st century, the need for creativity in the design studio becomes more important. The model motivates students achieves results and can also be applied at an individual personal and professional level.

Introduction
Teaching architecture is going to change dynamically by some strong effects of computer technology and multimedia which provides some benefits for evaluating the quality of learning. The most important benefit of computer technology in architecture is providing visual information to express ideas and to enable net-based communication for students. Both computer graphics and visual information are important matters for architectural lectures and design studios. Video conferencing is also important to get critics to attend other lectures. This usage of computer technology, of course, helps and affects students' design thinking.

Designing a building is a complex process that includes collaborative work among architects, engineers, contractors, and clients. Architecture always keeps refreshing itself according to human needs and the developments of technology, especially computer technology. Today, architects can use computers to design a building more efficiently by 3D modeling. CAD and GIS models, databases, images, animation and finally virtual reality are new ways of developing and presenting a project despite traditional ones. These are also included in a virtual design studio. The virtual design studio is distributed geographically because of Information Technology. IT is used not only in the business world but also in classrooms. IT helps architects participate in an interactive environment and to develop projects in cooperation with each other and for students in an increasingly information-rich environment to access any adviser chosen by them.

In the future, the architectural design studio will focus on the application of computing technology in design to conceive and conceptualize, to generate and to develop, and to analyze, evaluate, and synthesize. Innovative techniques will be available to enable, capture, share, present and discuss design ideas. (http://www.saed.kent.edu/Architronic/v4n1/v4n1.04e.html). For more than a decade, the Association for Computer Aided Design in Architecture (ACADIA) has provided a forum for presentation and discussion of innovative application and integration of computer technology in architectural education and practice. Now, more than ever, we face many new and still some old challenges, problems, and issues, some of which are critical to our mission and future as designers, educators, and researchers.

We have many desires and expectations for our students, some explicit, some tacit. I hope our studio will graduate responsible people who meet commitments; are generous to others; and are knowledgeable about the world, their heritage, the beautiful objects and experiences of life, the discoveries of today, and the challenges of tomorrow. It is important to be clear about such goals. It is equally important to lead lives that embody these goals. I can hardly expect architectural students to want to study, to love music, to be responsible and helpful if those around them don't model such behavior. In short, education is not just what happens in school; it takes place at home, on the street, in the wider community and especially nowadays as a result of daily exposure to the mass media. And yet, of course, we allocate certain facets of education to schools. We expect teachers to foster the basic literacy; to convey important insights and practices from our own society; to introduce youngsters to crucial bodies of knowledge and to the ways in which scholars have approached them—the "mental habits" of the historian, the mathematician, and the scientist. We hope as well that teachers will serve as role models.

Architectural Education and the Virtual Design Studio
Design education is taught according to Gardner: individuals have distinctly different kinds of minds—even and sometimes especially when they are members of the same family. Suppose that the assignment is to learn about evolution by reading a chapter and answering some factual questions. The parent of a youngster with strong "naturalistic" intelligence might accompany the child to a natural-history museum and

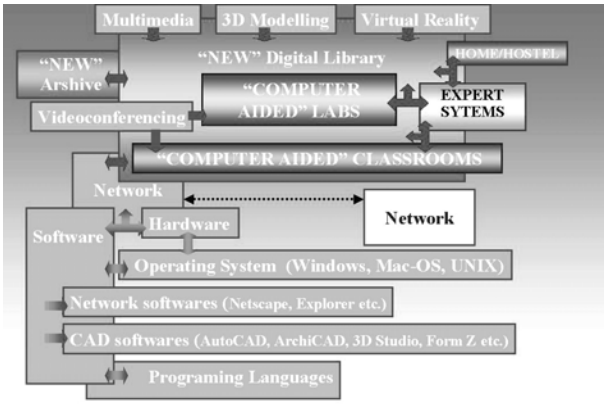


Figure 2.1 An Ideal CAD system (Tokman, 1999)

trace the antecedents of Homo sapiens. Siblings with other profiles of intelligence might benefit instead from viewing a drama about Darwin's life or creating a new form of "virtual life" on the computer (Gardner- 1999).

The Computer-Aided Design Studio of our department will be able to support communication, coordination and collaboration among a design team composed of students, advisers, experts and perhaps practicing architects and engineers. They will share knowledge and ideas from beginning to end and develop a design in an electronic studio with no boundaries. Multiple approaches can be followed when configuring the Virtual Design Studio. Each approach emphasizes the changing roles of architecture and the architect in the 21st century. In addition, the studies which have been done up to date appear to address critical issues in architectural design studios:

Socio-cultural approach

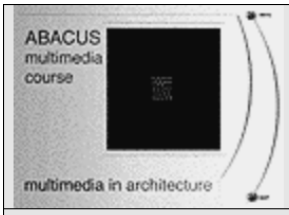
Architectural education is based upon questions concerning architecture and the region, the cultural and the social environment. The Virtual Design Studio (VDS) is based on computer-mediated communication and allows designers who are distributed across space and time to interact develop a project through the computer. This is the main difference between VDS and traditional design studio as a socio-cultural approach. In contrast to the traditional design studio, a VDS, theoretically, allows the participation of any person, at anyplace and anytime.

Theoretical approach

The design activity is a three dimensional work. In history the most important contribution that the Bauhaus made to architecture was that three dimensional perceiving was fundamental to architects. The Bauhaus also indicated the importance of "space" as a concept. Today, we can think of architecture in terms of organization of form, space and function guided by concept and aesthetic. In a VDS, three dimensional works are still important communication tools between students and advisers.

Methodological approach

The VDS becomes a tool for integrating developing technologies into design issues. According to Omer Akin (1995), we should consider computation as a technology that possesses all of the requisite potential to usher in a new paradigm of design education in architecture, rather than a simple substitute for a manual design tool. A VDS is well suited to address that goal because it is a distributed net-based studio in which computer technology is used as a main tool for the design process and presentation. This approach emphasizes the effective use of information technology combined with an architectural design process. IT brings to the design studios an interactive environment which allow students to access to any adviser they prefer. In addition, when students share knowl-



Multimedia
(http://www.strath.ac.uk)

Video conference
(http://www.strath.ac.uk)

Hardware

AutoCAD
ArchiCAD
Form Z
3d Studio
.....etc.

Software

3D modeling
(http://iris.abacus.strath.ac.uk)

QuickTime VR
(http://iris.abacus.strath.ac.uk)

Virtual Reality
(Zampi vd.,1995)

- CAD lab
- Multimedia lab
- VR lab
- Research Centers of Computer-Aided Design

LAB/Research center

Figure 2.2 The new components of design studio

edge and ideas and imaginations, they could learn more and also develop their own imaginations, and concepts. That is, communication gives students an intellectual point of view on architecture.

In recent years a number of research tools have been applied to the architectural studio. Contemporary architectural processes can no longer be formulated in a traditional studio system. In figure 2.1, The elements of a virtual design studio are illustrated. The main elements of the system are IT and an interactive architectural environment. The electronic library and its databases are supported by intelligent systems as advisers. The system can be accessed from any location and may include support for video conferencing, multimedia and VR. These are the new components of the Design Studio of the future (fig.2.2).

Recent developments in networked communications has extended collaboration to include electronic mail and the World Wide Web. But these tools have not yet reached their potential in supporting design processes. Today, there are two modes of collaboration design: asynchronous and synchronous (Gero, 1998). For collaborative design, participants can meet in the studio, discuss the project at hand and make alterations. The "virtual" user and "virtual" engineers are also invited to take part and give insight about technical and functional issues.

Technological approach

The Virtual design Studio provides an interactive architectural design education. But there are some questions at this point, such as (Gero, 1998):

- What metaphors should structure interactions in the virtual design studio?
- How can teleconferencing effectively integrate continual reference to the CAD geometric model?
- How do you deal with differences in time zones?
- How can video projection, etc., be used to bring participants on both sides into the virtual design studio?
- What should be at "home base" and what should be in remote locations?

Other difficult issues include: providing concurrent access to complex CAD databases, model organization, naming conventions, assuring data consistency and integrity, authorization, change control, and data security.

Today, Information Technology is capable of sharing documents, drawings, files and face-to-face meeting during a videoconferencing session in VDS. ISDN networks or ISDN connected digital networks are now also available in all major industrialized countries (Fig 2.3).

CONCLUSION

Today, educators, researchers and designers are discovering new ways of looking at designs by using computer technology.

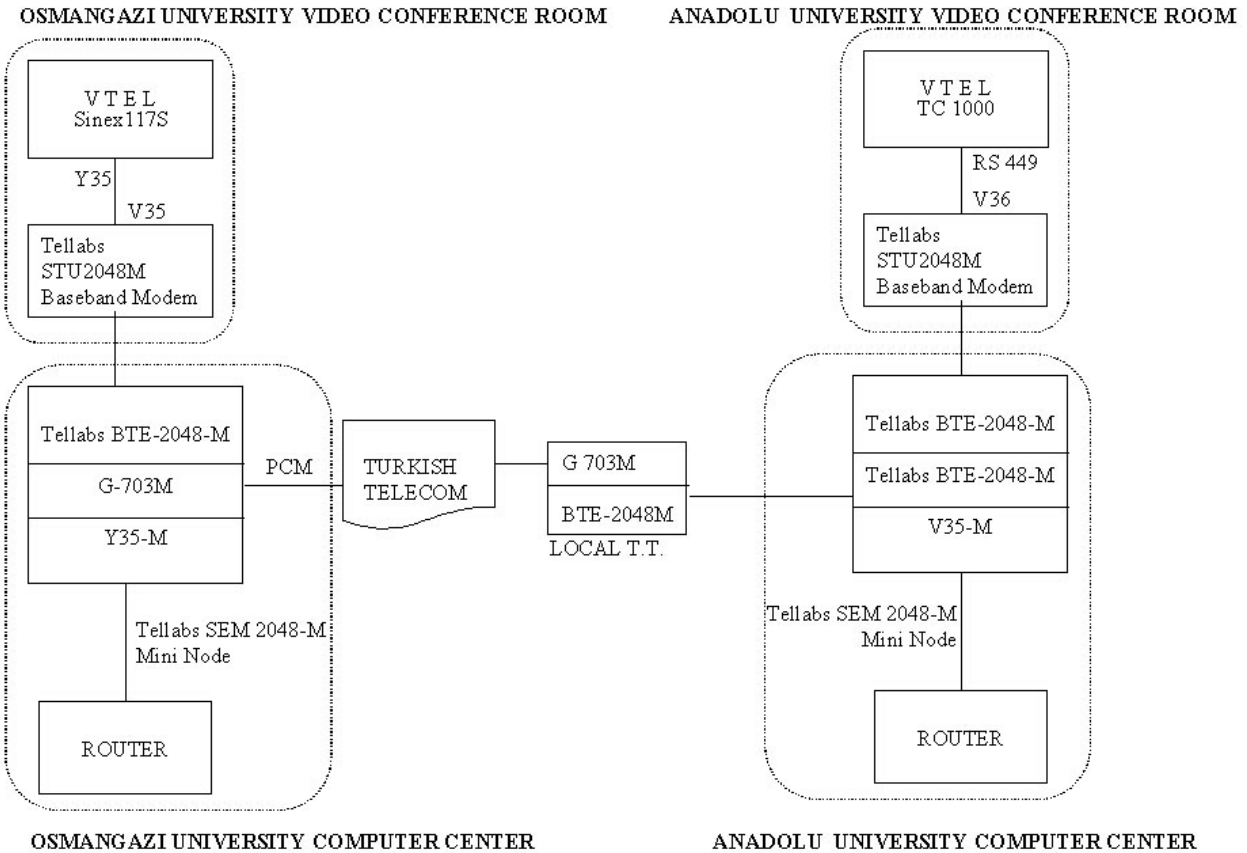


Figure 2.3 shows videoconference link between two Turkish universities, Anadolu U. And Osmangazi U (Open Education Faculty, Anadolu University, 1998).

Akin (1990) instructs to look at how the tool is changing the way we design. He also states that the computer has the potential to change the student, instruction and the instructor. Discussion about the role of the professor as an active user of the technology in an interactive visual debate is largely absent from current research.

Information technology brings an interactive architectural education to the graduate and undergraduate professional education. IT also plays a very important role in design studios. This technology providea students and educators with ways of communicating with other universities to develop projects or to attend studio critiques. Visual information is another positive point of IT. The Virtual Design Studio is still developing and researching the new way we are configuring our learning environments. According to Danahy (1992), computers should add the capability for two way visual dialogue to the review process. We should begin to use computers to foster the use of visual representations not simply as passive devices intended for the delivery of a message. Computers should be able to provide the capacity to generate pictures as a form of visual "discussion". Desk crits and even final reviews should become multi-way interactive visual discussions rather than one way visual propositions followed by only talk on the part of the professor. In this model -Danahy (1992)- visual material moves from being a passive medium (controlled by student) to an active participatory medium. At the beginning of 1990s, The new ideas about virtual design studious were starting from theory to practice. MIT developed and introduced the Design Studio of Future DSOF (http://alberti.mit.edu/dsof, 1998). This is a distance learning opportunity for architectural designers. VDS views architectural education as an interactive endavour in which students, advisers, architectural office members can collaborate even when they are geographically distributed.

Design studio contains constant interplay between the real and the ideal, practicality and fantasy, the physical and the metaphysical, the tangible and the symbolic. And as in most other forms of applied arts, one finds a melding of science and art, and a clear yet limitless space for imagination and freedom of the soul. In brief, the compositional message of design is that intricacy is more pleasing if based on order, and that diversity is more satisfying if it is attained through an element of unity. The study of sensible geometry leads to skill in all the practical arts, while the study of intelligible geometry leads to skill in all the intellectual arts, because this science is one of the gates through which we move to the knowledge of the essence of the soul, and that is the root of knowledge. The abstract geometrical arts represent the sophisticated development of a visual alphabet. With the help of a visual alphabet, modular units, repetition and variation, single units fitting into larger schemes and themes, we are able to achieve our aim: "Unit as expressed in diversity" (http://members.aol.com/darwishnyc/studio/concept.html).

The Sustainability Project

"A necessary component of a sustainable future will be a sustainable built environment. We need a revolution in how we think about, design, construct, and operate buildings and communities. We need buildings that take less from the earth and give more to the people. Imagine homes, offices, and communities that are net producers of energy, food, clean water, and air; that support healthy and biological communities; and that achieve a natural beauty through their harmony with the earth" (http://www.cometstudios.com/info/default.html).

The followings can be recommended (Yamacli, 1998):

- Relationships between future professional roles and educational programs,
- Necessities and possibilities of virtual in-office training and education,
- The relationship between architectural and technological education.

Design parameters interact with each other in complex ways, which cause effects and side effects. Predicting the expected performances of even primary effects involves extrapolating non-physical characteristics from the proposed solution's physical organization, a process which relies on a host of assumptions (physical, sociological, psychological, etc.) and hence is seldom a reliable measure. Eventually, this process will be able to play a decisive role in the definition, evaluation and putting into effect of design studies or works for the future. The difficulties of formalizing and fully understanding the mechanisms of learning, creativity, and the critical capacities necessary to develop an activity such as designing, seem to be insurmountable under current conditions.

In the frame of the teaching, even the best schools cannot teach everything. In fact, we think the best schools do not even try to cover all fronts. We should bone up or remember the knowledge we value and teach it to the students. Sometimes it will be academic subject matter, but just as often it will be a value or an attitude. But each undergraduate architectural study must identify its own values. Some will highlight competition, others cooperation; some will stress mastery of technology, others the cultivation of an art or craft or the achievement of athletic prowess; some will seek a curriculum that emphasizes facts and figures, others a curriculum that encourages youngsters to be creative or even iconoclastic. We cannot all find architectural education that meet these goals. We urge that the learning environment includes several educational experiences. This statement reflects a recognition that teaching and learning can occur in many real and virtual places and that work need not be contrasted with play. The ultimate test is whether youngsters grow up to be decent human beings and whether, when it is their turn, they can successfully transmit values and practices to their offspring.

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BOOK REVIEW

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Envisioning Cyberspace: Designing 3D Electronic Spaces, by Peter Anders with a Foreword by William J. Mitchell. McGraw-Hill, 1999, ISBN: 0070016321, Paperback, 256 pages.

Peter Anders' comprehensive and stimulating *Envisioning Cyberspace* is about the "spatialization of cyberspace…[where] space [is used] as a tool for managing information, thought and memories". Anders is talking about cyberspace as a place to organize and view the large databases we are assembling to represent the complexity of life.

"Since our experience in life is multimodal," he writes, "involving all our senses, space offers us a perfect model for creating a multi-dimensional information environment." Anders goes on to spend the bulk of his book exploring examples of the use of cyberspace in provocative cutting edge applications. He describes the nature of human cognition and its reactions to computer generated stimuli. Along the way he samples scales of abstraction, navigation, presence, immersion, navigation, personal space, multi-user domains, gaming, virtual communities, and art.

He treats cyberspace, originally a plot device used by the famous anti-computer novelist William Gibson, as a real place with all the opportunities for personalizing scale, color, texture and form that actual space has. There is an implied notion of well-designed cyberspace as there is well-designed architecture. But if the various topologies (forms) of cyberspace are the main focus of Anders descriptive book then what is the function of cyberspace?

Said another way: assuming we can make of it a convincing analogue of reality, then how can we use virtual space in non-trivial ways? Anders wants to use cyberspace to promote community and collaboration. He is captivated by the rapid blurring of the boundary between cognitive and perceived space, as humans adapt easily to new rules of virtual interaction as if it were real life. But he relies on art rather than business for his examples.

When Anders describes the architectures of the virtual world he posits a correlation between cyberspatial form and information function. One of the most vivid examples is the Stuart Card/Bill York model of a corporate internet. A series of files nested within files nested within files float in a virtual sea, resembling a man of war jellyfish seen from below. Hence its name: The Fish Eye version. Deeply nested files are spatially deeper in the virtual ocean, though there is no justification for the arrangement other than as an analog to the human experience of scuba diving.

With such a virtual model in mind of how information is structured it is possible to understand intuitively how search agents can find obscure pieces of information. One of the most compelling images I remember from film is that of the