CAAD EDUCATION AND POST-GRADUATE OPPORTUNITIES (AT MIMAR SINAN UNIVERSITY)

Abstract:

This paper addresses new design teaching strategies at an important and traditional university in Istanbul, founded as the Academy of Fine Arts 110 years ago. It will include a short review of design education before the Academy changed into a university, and a description of the present situation with regard to computers. Nearly two years ago, CAAD education was introduced as an elective subject. The students show great interest in CAD; most Turkish architects now work with computers and CAAD graphics, although automated architecture has not yet become firmly established. The aim of the CAD studio is also to establish an institute which will allow university staff to develop their own programs and to pursue scientific research in this field.

On the basis of rising requests from researchers and students , rapid and healthy developments should be made to keep up with new technologies. As the improvement of the specialized involvement with CAD is the future target, MSU is attempting to broaden its horizon by including design methodologies of the last decades.

Introduction and Background:

MSU of Istanbul was founded in 1883 as an institution of higher learning under the original name of the «Academy of Fine Arts». The Department of Architecture was opened the same year having a four year study program. The first professors were Italian architects like Alexandre Vallauri, Philippe Bello, and Giulio Mangeri. At the turn of the century these Italian architects' work was so influential that the first students to graduate from the Academy went on to design such famous landmarks as the Waldorf Astoria Hotel and Rockefeller Center in New York. During the Thirties the first leaders of the New Turkish Republic carried out the rebuilding throughout Turkey of the destroyed and neglected situation. This neglected situation called for man qualified architects. One of the these men was Prof. Ernst Egli from Switzerland. Prof. Egli brought active and contemporary ideas to Architectural Education. These ideas were realized in the form of the German system of two stages of education over a five year term. The first two years were spent in preparation for the second more detailed stage. This second stage was mainly carried out in the form of workshops which emphasized central design studies. The most important teachers of this era were German professors like Hans Poelzig, Bruno Taut, Robert Vorhoelzer and Gustav Oelsner. The Academy was noted for having the best German teachers of the time.

The Academy's name was changed to Mimar Sinan University in 1981 under the law of Higher Education. It was at this time that the Department of Architecture became the Faculty of Architecture offering an education system of 4+2 years, offering degrees of Bachelors of Architecture and Masters of Architecture respectively (normal architectural studies and post graduate level).

Until the present, the Department of Architecture, at MSU, has enjoyed an element of success and prosperity. Unfortunately at the present time the limitations of finances, Faculty and maybe even more importantly facilities have left a deficiency in the desired level of Academic excellence.

It is in these necessary elements that we find a need to show greater effort. The most important area that needs attention is in the development and continual implementation of the CAD program.

Basic Ideas at MSU Leading to CAD:

It is well known that the basic designing tools for architects are sketches and drawings. Architects make use of three informational tools: plans, sections and elevations. The spatial elements of design are carried out with sketches and working models working hand in hand.

Besides the advantages that come from technology, architecture by necessity is comprised of the fine arts. The human elements of creativity bring a liveliness to architecture that would otherwise he void if only the technical approach of technology were considered. An architecture design without human input is not imaginable. In contrast, the method of design by computer is more abstract.

Some institutions are still offering the limited methodological and semantic programs in their architectural education. This offers a one sided approach, failing to acknowledge the benefits to a more contemporary and well rounded program that would include CAD.

At this time, in Turkey the Planning of Human resources are not effective enough. Students take entrance examinations for the universities without complete awareness of their capabilities. The problem is hightened by the random assignment of educational branch by test score, which decreases the success of the individual along with leaving specific profession qualifications lacking. In contrast, when viewing the entrance process for European Education of architecture, there is no limitation of entrance to the regarding school of education. In the European model the elimination and success of the architectural students is distributed over the whole architectural education process and not just a single test score taken at the end of secondary school.

Design is the representation of the sensual perceptions on paper. Even if an idea is very interesting if it cannot be represented by a drawing it is unuseful. As long as the students cannot combine the technique of representation with their design skills they will try to explain their design verbally, which occurs frequently. Thus it becomes the responsibility of the teaching staff to effectively teach students how to get their ideas into design form.

In the past, it seems, that the charismatic and lively animated professor was better able to communicate to his students on how to transfer ideas to design. It is then no wonder that these professors see no current need for technological tools to aid in this process. The obvious decrease of institutions and individual professors who hold to this view has paved the way for implementation of CAD.

The CAD-user, whose budget is not unlimited, must first realize the parameters of his own software. It is in applying and experimenting that the CAD-user will understand the limits of the representation techniques for his own program. Even after this experimentation he may realize that his program is too limited and it is at this point that new alternatives need to be researched.

In architecture working with computers will one day be exactly like it is today in other fields, like graphic design.

The most important innovation will certainly be the possibility of seeing and criticizing the buildings before they have been built. This benefit will not only he for the architect but also for the investor or owner as well. At this point, we must ask, will the architect or investor still be satisfied by simple plans" sections and elevations? Or will computer graphics make them desire more?

The Changing Design Study:

In March of 1991 the Faculty of Architecture organized a teaching lab of Computer-Aided Design on a trial basis. The lab is housed in a former design studio. Though the beginnings were unpretentious, we have always kept high goals in focus. Many Turkish architects have already begun to work with CAD, therefore, it is an indispensable matter of fact, that they have begun to look for graduates who are able to use it. Also on the basis of high demand from the students CAD needed to be implemented as quickly as possible. The CAD-Lab became a very important contribution to the common education of architecture students.

From 1993 on it is planned to extend the borders of this discipline to the students of the department of Urban Planning, also under the Faculty of Architecture. Another aim for 1993 is the organization of a Research Center. This Research Center will mainly focus on developments in design research and coordinate other research institutions to share their experiences and new technological advances.

The CAD-lab will act in the following areas:

i. Computer Hardware and Software Training:

Most importantly this training encompasses the basics in computer applications. The focus of this basic application training is for both the taculty and the students. After acquiring these basic computer skills the students are better prepared to handle more sophisticatedly advanced hardware.

ii. Acquisition of Design Critic Knowledge:

It is now obvious, that computers are a necessary tool in the process of design. Tools are supposed to serve their user's goals, so it becomes necessary to have the proper tools. The wrong or outdated equipment will keep the teaching staff from realizing its educational goals. The problem lies in that the competent teaching staff may be short of the necessary technical knowledge about the computer and software market which is developing so rapidly. Let alone what innovations will be introduced to the market in the next semester. Misinvestments can be avoided, by the teaching staff, with the knowledge from computer market insiders. This inside knowledge allows for the questions of what the equipment can do efficiently and where if limitations lie to be answered readily.

The CAD lab also has the added advantage of providing for an area of communication and interest among the various departments and professorships.

iii. Computer Lab as a High-Tech Center:

Of course some computer design possibilities are realized only with particularly powerful and therefore expensive equipment. The financial resources for this equipment are at the best sporadic and often limited.

It is at this need that industry can be addressed. In making initial contacts with the computer companies it should be pointed out, to them, that the university with its nearly

unlimited creative potential can by all means be recognized as a precious partner.

In general, profit motivated firms are narrow in their endeavors. Their goals are aimed at success defined largely by profit margin. This definitionof activity, motivated by profit leaves very little room for experimentation and the trial and error process.

In contrast, the university, by definition, encourages experimentation not limited by the need to produce. In this way many different applications can be carried out. If some of these applications are found to be deadlocks, totally new possibilities can be explored.

Thus, it is conceivable and profitable that the university volunteers as the initial field tester of a new CAD-software. After the initial field test by the university the architects, video-artists, industrial designers and fashion-stylists will be able to do the final acid-test. As industry places the necessary untested hard and software at the disposal of the university, in return, it receives an unlimited input by experts in the field, as well as an initial introduction of its product into the market of the future purchasers of its software.

Present Situation at the University:

The current equipment in the CAD lab, consists of the following basic though limited hand and software:

Principal hardware:	11 PCs (with coloured monitors, mouses and digitizing tablets), 2 Matrix-dot printers, 2 Plotters, 1 Laserjet printer 1 Scanner
Principal software:	Last versions of DOS as disk operating system, AutoCAD, Norton, Autoshell, Wordstar, Lotus 123, Ventura Desktop.

Currently, a workstation consisting of five computer terminals is planned, and final preparations for this workstation are being made. This workstation will be located in a new studio, thus establishing a second computer facility.

Though demand is high, the optional courses offered have to be limited because of insufficient equipment and space. This problem is hightened by shortage of CAD trained staff. To aid these problems it is proposed to add Apple Computers to our equipment base allowing for greater access. This access could lead to the offering of compulsory CAD courses.

To date, our courses not only include teaching the technique of CAD but more importantly how to design using the the computer as a medium. These courses are as follows:

i. Introduction to Computing:

This course is held in the 3rd or 4th semesters respectively with maximum of 30 students in each term. It concerns general knowledge of hardware, operating systems, collection of organized information, word processing and specifications, etc,

ii. CAD for Architects:

This course covers CAD basics, drawing and design strategies such as building a drawing in 2D and beyond the second dimension. Each student is supposed to present a simple project at the end of the term. 30 students of 5th semester are accepted for this two-semester course.

iii. CAD Studio:

After short information on seeing and communicating in three dimensions each student develops a small project on the basis of the computation-knowledge obtained in the CAD lab. The critics and corrections are carried out by the teaching-staff. This optional subject is assigned for a maximum of 6 students.

iv. Automated Architecture:

This course is assigned for post-graduate studies for a maximum of 6 students. They try to develop subroutines, file operations, macros and libraries, also a general look on UPLs such as C, AutoLISP, BASIC, etc.

New Horizons for the Formation in the University:

Over the last fifteen years, there has been a continuing debate over the classic educational environment as compared to progressive changes in the western models. It is imperative that we make the necessary changes to bring our programs up to standard. Our liabilities, including the vast number of students and the lack of teaching-staff (in quantity and quality) cannot he managed, because of the accentuated factors of financial bottlenecks and inadequacies in the university budget.

Technologically advanced tools are becoming more and more important to the success of the educational process. Therefore it is recommended to be continually testing new computer-aided education methods in the computer lab. The greatest benefit in this area could be derived from interactive education systems with VCDs, electronic handbooks and simulation systems which can proceed on several layers.

An education in the traditional sense with a lifelong «user guarantee» does not exist any more today. By necessity, we are obliged to keep our knowledge upon the recent state of technological developments. It is necessary to implement todays acquired knowledge immediately, otherwise in a short amount of time it will be superseded.

It is at this crucial point that the computer lab endeavors to meet the challenges of importing progressive up to date information and techniques. In the computer lab a classic teacher student relationship need not be thus limited any more. After attaining a certain level of knowledge and expertise in the lab this student becomes a conduit of information to his fellow students, taking on the teacher role. It is even conceivable in a specific area of accomplished expertise, that the student becomes the teacher's instructor. This way the knowledge is not only transmitted in a linear manner. But a pyramid of knowledge, so to speak, emerges in which each participant in the computer lab can take on the role of either teacher or student.

Conclusion:

The process of educating architects has to proceed from the point of view that, in the future, each architect will work with the PC/CAD. However as before, the design-formation should never be neglected, now in the sense of the real creative facts. A

graduate, who leaves the university without having learned how to design. and who has not noticed which talents and creative abilities are housed within himself, and who instead of this is operating his computer like a toy, will not be able to achieve a positive contribution to the design of our architectural environment of today.

I want to conclude my contribution with the following, words of Prof. Kramel, "CAD does not mean the continuation of the existing planning and designing process just with new tools. However it creates a new higher degree of systematic and organizational processes, taking into consideration the requirements of both research and development."

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