

Teaching and learning - full brainwash

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We often speak of changes in design process due to an application of computers. But in my opinion we more often rather speak of lack of changes. Lets hope that some day we will be able to witness full integrity and compatibility of design process and tools applied in it. Quite possible such an integrity may occur in the cyberspace. Nevertheless before that could happen some changes within the teaching methods at faculties of architecture, where despite great numbers of computer equipment used, the students are still being taught as in the XIX century. In terms of achieved results it proves ineffective because application of chalk and blackboard only will always loose to new media, which allow visual perception of dinosaurs in Jurassic Park. Our civilisation is the iconographic one. And that is why teaching methods are about to change. An application of computer as simply a slide projector seems to be way too expensive. New media demands new process and new process demands new media. Lets hope that could be achieved in cyberspace as being a combination of: classic ways of teaching, hypertext, multimedia, virtual reality and a new teaching methodology (as used in Berlitz English School - full brainwash). At our faculty several years ago we experimentally undertook and applied an Integrated Design Teaching Method. A student during design process of an object simultaneously learnt all aspects and functions of the object being designing i.e.: its structure, piping and wiring, material cost and even historic evolution of its form and function. Unfortunately that concept was too extravagant as for the seventies in our reality. At present due to wide implementation of new media and tools in design process we come to consider reimplementatation of IDTM again.

And in the same time I was able to see trough eyes of my soul how Fredrikson dreamed out that boat, how he designed her and turned out her drawing.

T. Jansson
Muminpappans memoarer

What is the mechanism of a design process, and how does it work? That problem was deliberated many times. Everybody dealt with it. Beginning from the character in Towe Jansson's book and ending at C. Eastman. And within our society, here and there, a discussion about changes in design process due to an application of computers could be overheard. But as the reality shows. We in my opinion more often rather speak of the lack of changes. Let's hope that some day we will be able to witness full integrity and compatibility of a design process and tools applied in it. Quite possibly such an integrity may occur in a cyberspace.

But in order for that to eventually take place, the answer to the three important questions posted by the organisers of this conference would have to be provided:

1. Should education concentrate on the CAAD software?
2. How we can create a base of practical experience for education purpose?
3. To what extend can CAAD be integrated into the architectural curriculum?

Answer to the first question is very simple and reads - No.

Answer to the second question in their work provide: R. Oxman and G. Carrara. The second quoted wrote in his work:

"Explicit representation of design knowledge is needed, if scientific methods are to be applied in design research, and if computers are to be used in the aid design education and practice. The representation of knowledge in general, and design knowledge in particular, have been the subject matter of computer science, design methods, and computer-aided design research for quite some time. (...) The representation is intended to form a parsimonious, communicable and presentable knowledge base that can be used as a tool for design research and education, as well as for CAAD". (G. Carrara et al., 1992) In my paper I would like to focus on the third question, but that question in my opinion should be a bit differently formulated (more general). That seems not to be possible to deliberate the position (importance) of CAAD in architect's curriculum, as it is in case of other disciplines being taught at architectural schools or faculties.

Introduction of CAAD to a teaching schedules unquestionably and explicitly uncovered the need for changes within the whole schedule of study. Where insofar despite great number of computer equipment being used, the students are still being taught as in the XIX-th century. In terms of achieved results it proves ineffective, because the option to use a chalk and a blackboard only, will always lose to a new media which allow a visual perception of dinosaurs in Jurassic Park. Our civilisation is the iconographic one. And that is why the teaching methods are about to change. An application of a computer mainly as a slide projector seems to be way too expensive. New media demands new process, and new process demands new media.

The third question than, should be formulated as follows: How will the architectural curriculum be affected by implementation of CAAD ?

At our faculty, several years ago we experimentally introduced the Integrated Design Teaching Method.

While in the traditional teaching system we dealt with a discreet, incidental method. A student, as he progressed through a course, was asked to design more and more complex and difficult architectural objects - from cottage house to a theatre, simultaneously obtaining knowledge from all the engineering and technical areas and economic aspects of his/her future profession, during lectures and seminars along the course in rather chaotic (random) order. The interaction between architectural design and engineering disciplines being taught, was not the strongest point of that method.

The presented above teaching method IDTM encouraged the trend "to specialise" within one discipline rather, but did not create conditions helping to educate general architects (architects generalists). But an architect, who does not possess a generalist type of mind, is not an architect at all. That is why an attempt of transforming the program into the new one, in such a way as to allow a transition from "getting specialised" to "getting generalised". In IDTM created by Z. Pininski and J.M. Ullman (Pininski Z., 1985) a student during the design process of an object simultaneously learnt all aspects and functions of the object being designed, i.e.: its structure. piping & wiring, material costs and even a historic evolution of its form and function.

How it was practically realised at our faculty ? At a design lab were present not only architect but all specialists of the other disciplines related to a project as well. Under supervision of architect they served with their specific knowledge, inseparable and important to a complexity of an exercise project being a task of such a lab. That allowed the optimum proximity of student's design process to a real life design experience. In the same time, during engineering labs students received theoretic knowledge required at the current level of design process. For example during first semester students were made familiar with all building details, from a foundation to a roof - of a cottage house. At fourth semester along the project to design a hotel, students learnt about the same all details, but this time obtaining much more expanded and specific knowledge. That way of teaching could be named a "spiral teaching method". Thanks to periodic repetitions of material students were able to better memorise it.

The following chart shows the difference between IDTM and the Traditional Design Methods according to Z. Pininski and J.M. Ullman.

Characteristic feature	Traditional didactic	IDTM
Kind of activity	Lectures from specific disciplines	Multi-disciplinary activities
Type of knowledge	Answer to the question "WHAT"	Answer to the question "HOW"
General teaching methodology	Monographics	Inductional
Detailed teaching methodology	Lectures, seminars, tests, consulting etc.	Dynamics activity, inter-level methodology student groups
Preserving of knowledge	Relay race system, without repeats	Spiral system
Link with a practical experience	Academic knowledge	Knowledge derived from practical experience
Coordination	Disintegration of architectural and urban planning research	Integration of architecture, urban & space planning, environment
Teaching priorities	Equal status of all disciplines	All disciplines subdued to design process
Strategy of study	Required detailed knowledge from all disciplines	Complex study of a problem
Quantity of staff involved	Range of 6-15 students per teacher, per hour	Range of 6-8 students per inter-disciplinary group of 4 teachers
Qualifications of staff involved	Specialists, experts	Generalists
General characteristic of curriculum	Stationary curriculum	Dynamic curriculum

Unfortunately that concept was too extravagant and too much futuristic as for the seventies in our reality. At present due to a wide implementation of new media and tools in design process, we come to consider reimplementation of IDTM again.

In this spot it would not be unfounded to return to the second question posted by the organisers of this conference. The structure of IDTM presented in this paper could be incorporated quite easily into knowledge bases just being under development at some architectural schools nowadays. Knowledge bases, in where knowledge about design is not only being structuralized, but also inter-disciplinary linked to other engineering science. The structuralization as such, is not efficient enough to create a modern teaching methodology. "Children during their preliminary learning stages quite often learn reading through pronouncements of separate phonemes. That helps them in learning the alphabet, but does not contribute to the ability to understand of what was read. As one little boy put it: "Today we've learnt to spell b-a-n-a-n-a ,

but we still do not know how to read ba-na-na". (Weinberg G.M., 1975) It looks as today-thanks to introduction of new, computer technologies we can stop "spelling".

Already in 1986 S. Porada wrote: "Today's level of computer technology development allows us to redefine the problem of a design language creation, because the tools we were given permits to build a data base common to all design process participants". (Grigoriev E.P., et. al., 1986).

The presented here Integrated Design Teaching Methods seems to form a proper skeleton for use of computer knowledge base. We can state that the problem does not lay in how will CAAD be incorporated into the architectural curriculum, because it is CAAD that has the potential to become the integrating factor of architectural curriculum.

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