

**CAD-education at Munich**

feeling  
Christoph Lintl  
Demetris Economides  
Martin Hesse  
Vera Langenbahn  
Sigird Roth  
Christian Brack

**CAAD-education, some basics**

We are stressing the idea that a combination of learning CAD and developing a design-work will hardly lead to success. It is first important to learn the principle handling of CAD - only then a reasonable application can work out. Our pupils have the chance of comparing, learning and working on several different CAD-systems with different philosophies and purposes, so the interested students have the opportunity to choose a tool that fits their working-habits and their designing-methods.

Out of an overall number of 200 students of architecture each semester about 150 are willing to participate in the CAD-curriculum.

100 will be left after the low-level introductions and exercises, done with the standard: AutoCAD - these students than have a basic idea of construction with computers. Those students who are going into details are deepening there skills to an extent where any experiment is feasible. It is hard work to get to this perfection.

**Cooperating with CAD-tools**

40 at last are really into CAD-applications with a sample of professional CAD-systems as Auto-CAD-applications like ACADgraph and approved systems as Nemetscheks Allplan, Star\_UX Ribcon, ArchiCAD. We are constantly checking whether there is not some need for adding a new system.

An interesting experiment we are dealing with is an interdisciplinary project in collaboration with another professor which has been running for a number of years. The results are astonishing. The subject of study is the design and shaping of space where we are trying to analyse the coherence and feeling of space.

These thoughts are illustrated by mostly unrealized projects of the Modern classics - as there are Le Corbusier, Adolf Loos, Frank Lloyd Wright and Richard Meier - trying to impart to the students the stereoscopic thinking with planned rooms that have never been built.

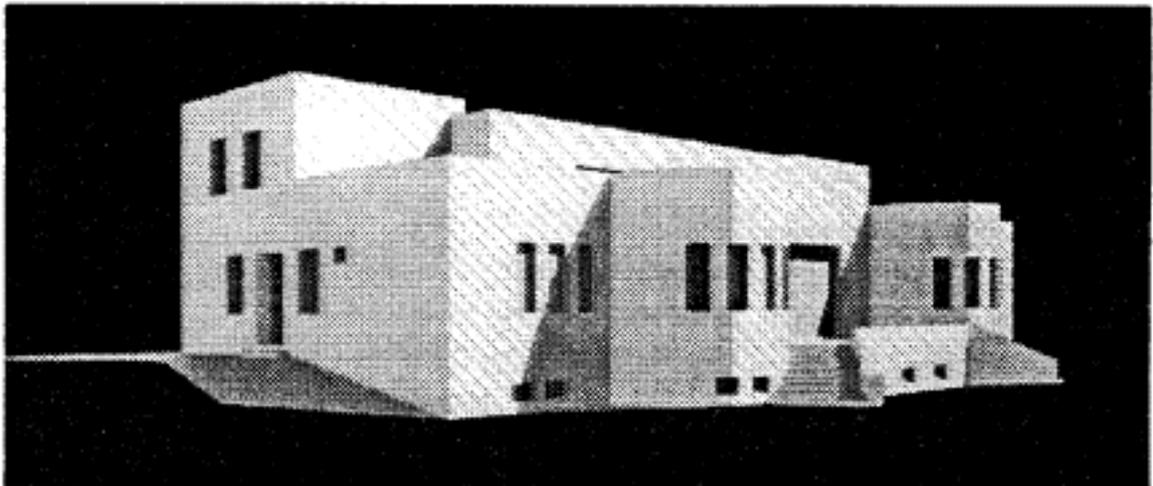
Several students are following up to this target by doing patterns and conventional plans while more and more others are entering a complete 3-dimensional data model by using their computer. The student - playing with this model on screen - is able to learn the coherences of space in his project by traversing different series of rooms.

The work aims at the development of pictures of interior scenes, several positions of the sun and different light conditions will be looked into; sequences of rooms can be traversed.

In the course of work it has become apparent that CAD is also an excellent decomposition tool, when you can analyse the proportions of the spaces' surrounding elements. It's easy to show the different levels of a building in one explosive drawing whereby nevertheless the coherence of the totality is preserved. So CAD is a much better tool to get an abstraction of levels and sections than a drawing sheet.

In any case it is of high importance to simulate the whole building in a complete data model to produce shaded pictures or views through staircases - overlooking several levels - and also the production of conventional plans. As highest result screen photos or an animation can be done and saved in form of video tape. High-end realization is needed here in order to support the focussed targets and that's why we use systems like Star\_ux, Allplan and Explore at two Silicon Graphics workstations.

As support we also offer 2D- /dtp- and image processing- opportunities as Adobes Photoshop/QuarkXPress.



These results are often exactly diametrically opposed to the wishes of the faculty: they would like us to produce site-plans with CAD - and preferably only them. Rendered screens are even in our days considered as not consistent with the aims of architectural education.

When one has succeeded in gaining the basic skills of system handling, one is able to do original design work by help of the system - without traditional tools. Design decisions must be done at an early phase. Some projects are very appropriate for design-work with CAD - others not.

Alas, the TUM has to face a number of problems, which urges us to think our strategy over:

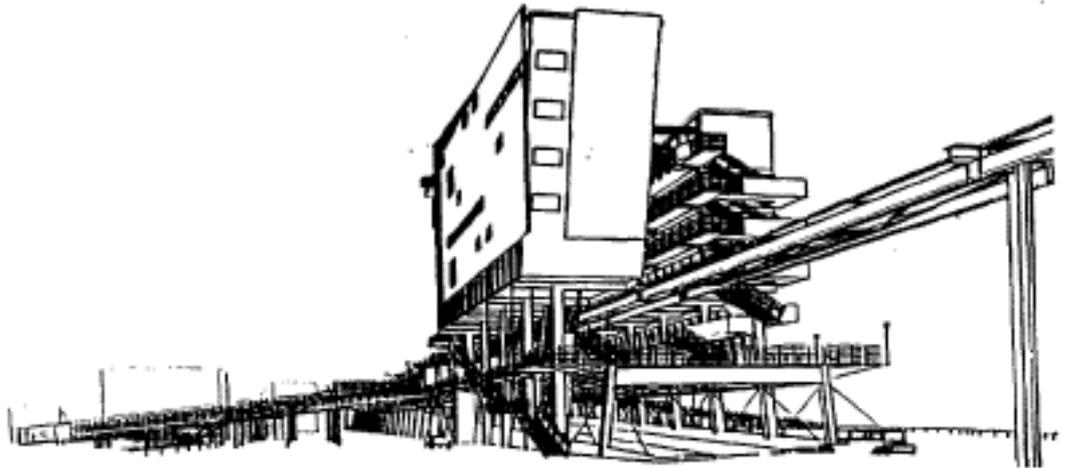
- I The multi-system-instruction means a lot of work for both, students (much more intensive for the CAAD-subject than for any other exercise) and for teachers (CAD affords plenty of "online"-help and soft-/ hardware-knowledge).
- II The new generations of CAD-students have almost no 'real' interest in CAAD. There's a noticed lack of pioneer-spirit and enthusiasm, which were common features of the early CAD-pupils.
- III Many students are seduced to get lost in true-color-renderings and an superfluous production of 'fascinating' pictures, while they completely forget thinking about how to construct.
- IV An increasing number of CAAD-students and the bunch of different systems are reducing the research-opportunities of the staff to a minimum and increases the time, that has to be spent on the machines and, as a result, we are faced with an huge fluctuation of institute employees. Despite all that, when it gets dark, you can see one institute at the court of the TUM, where the lights are still burning.
- V It's difficult to cooperate with some of the "old-fashioned" institutes, so we still are in a duty of legitimation, to prove the advantages and possibilities of this expensive tool, for not to say: toy.

We try to make our conservatives realize, that probably even the 'old masters' would have been thankful for our powerful instruments: e.g. Loos always was complaining about the fact, that his architecture was not to be shown with the traditional 'handmade' way. If the abstraction of architectural space in site plans is no longer or only hardly readable, a computer aided simulation of that space can be a true and simple representation of future reality, that is going to be built. Sketches and models finally are very virtual, and photographs of the real environment combined with models often give too much useless information and by that are able to cover the important architectural messages. We even have to mention, that buildings are static: they force the spectator to change his point of view, if he wants to have a sensitive experience of the whole building. Animated pictures help to understand spatial relations.

If decisions can be done at an early phase, if you gain a sequence of design decisions (that means if you don't need the mere accidents of your polyvalent sketches with pencil on paper) and if you have succeeded to gain the full skill of system-handling, you are able to do original design work by the only help of the system and your brains. Working without scale, the first ideas will still be in the final product, when you are creating more and more complex elements out of the simplest ones. It is apparent that you cannot copy your traditional technics of designing from your pencil to the machine. We already know, that design does not exist until the moment it is expressed through a particular medium. But now conception and representation are no longer two separate issues.

### **Two projects are shown as examples of CAAD:**

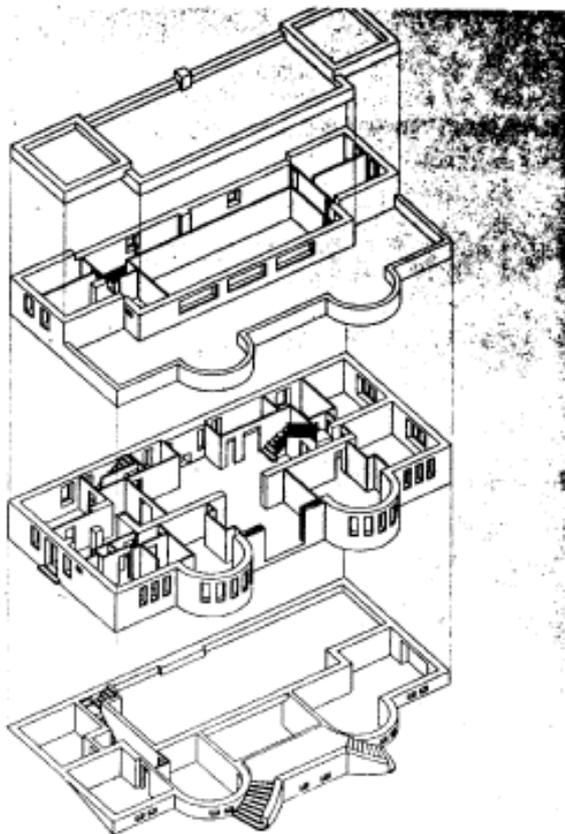
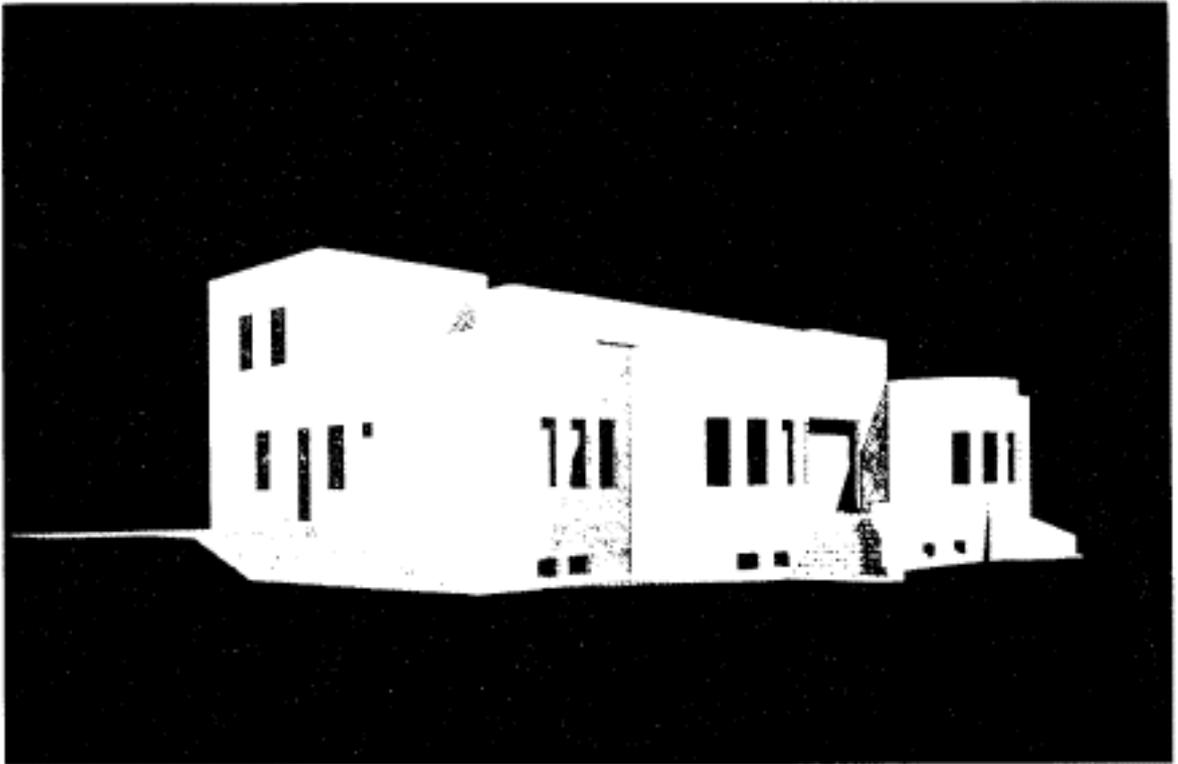
A scenographic way of presenting a project is shown with the modification of a parking-house into a little 'mall'. Architecture becomes a process, in space - like a stage, a theatre: a little scenario is worked out, a script is written - and in time - using the inversion of day and night. The designed object can be seen as an alternative to the existing situation.



The second work is movement of traffic, who cuts the city in fragments of time, working with the same methods as film does. It is a visualization of an abstract traffic concept, which was essential for understanding the results of the design work. It takes only 2 seconds to recognize a picture, for that it can be remembered. A complicated traffic-solution can be 'understood by the eye', evokes emotions and gives informations about possible changes of locations, where you know i.e. you have pictures in mind, how they look like now. So computers also could be a moment of transparency in plannings of future environments of common interest, having to be clear for the public, which mostly does not consist of architects, able to read plans.

These are only examples, of how we think CAD can be used by students, transferring their knowledge to the architectural studios, where CAD is commonly used as a 2D-drafting-tool, and not as a support medium to realize the design.

The success of our education-system is proved by a great deal of interest for the CAAD-subject, so that other institutes now are beginning to introduce some workstations as a liability for their design-tasks, worked out by our numerous output of trained and experienced students.



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