Visualisation for clients - one example of educating CAAD for practice

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Fig 1. CD-rom, menu. Student work from design program.

Abstract.
During the spring term 1996, 13 students of the 3rd and 4th year at the School of Architecture at Lund University had the opportunity to make a one semester CAAD project. 11 students chose the individual exercise to use computer media for developing a small architectural design in interaction with a client. The focus was set more on visualization and the process of communicating ideas, feelings and practical solutions between architect and client and visa versa rather than concentrated on the final product.

This paper describes the process of the project and the reflections of the participants. It will discuss problems from the teachers point of view such as:

- authentic users in education programs
- which possibilities does the computer media offer the architect
- computer program training and design practice.

Background and problem area
When Architect offices in Sweden advertise about vacancies “CAD” is prescribed. Up to 75% what is asked for are skills in making plan drawings in AutoCad. The task is to become a fast CAD operator. As we do not want our former students to be stuck as plain CAD operators we find it important to armor them with knowledge enough to be able to improve architects’ use of CAD to CAAD.

What will that mean? Practitioners often criticize architecture schools for being far away from the real world. We stress that education for pedagogical reasons has to be general, that the curriculum is short of time and therefore can not deal with “trivial” problems. New architects must be educated to work a bit into the future. And ”Practice” from the students point of view
has to be practice in the new age which we at the moment can not know very much about. For instance, which are the consequences in our field of business of the new integrated electronic medias as described in for example Negroponte’s ”Being digital”\(^1\)? We do not know but we have to choose.

In this CAAD project we chose to focus on visualization for real clients in the design process.

The reasons are:

- In practice clients pay for the architect’s job and naturally expect to get something out of the use of CAAD. Using CAAD as a design tool goes without saying. Visualization generally is supported by CAAD and can be used by the architect for a convincing presentation of his design. Probably this is more in the interest of the architect than the client. It might also be used to give the client possibilities to participate in the process with a better understanding of the problems. User engagement and more knowledge into the process must be in the interest of the client.

- In education of architects the other actors in the design process are represented by the teachers and they are no clients in the sense that they can read drawings etc. From practical experience we know that naturally real clients or users look differently at a design than a designer and will ask for other views and information.

- Communicating with an authentic client affects the architect’s role, design methods and attitudes. It is the kind of knowledge Donald Schön describes as best being learnt by ”Reflection-in-action”\(^2\). In a design program group it means making a survey by getting a lot of examples to reflect upon; helping us to test and understand more. It also deals with relations between teacher and students.

- We want to stress the interactive part, where the architect has to be alert in argumentation at any time, having actual visual material to use instead of making sporadic presentations. In practice this interactivity even affects the other actors in the process such as consultants, legislators etc.

Problems

Visualisation for clients in the design process should at least raise two main questions to the architect.

*Does the client’s visual needs differ from my own and how?*

Technically learning CAAD primarily gives the student a hint of how it can be used to serve the need for introspective visualisation. You quickly learn how to make a fast rendering to visualise a problem you are working on and to delete it again. You do not take the time to care very much about the visualization as an understandable image! As

\[\text{Fig. 2. A "user friendly" model}\]


a matter of experience you have to practise on making understandable images before you summarise your proposals in any kind of presentation.

How do I use the images to create engagement and participation?

There is a lot of research in user participation stressing engagement and understanding to be important factors for anything creative to come out of the process. A pedagogic role in combination with an informative media ought to be important factors.

It is important that the teachers give a good example. A pedagogic experience launched by Paulo Freire among others is that students often use the same pedagogics they were treated with when they have to teach themselves. The client must be engaged in a process where he learns about his needs and the possibilities for his house and can make the right decisions guided and inspired by an architect.

Experiment - empiricism

CAAD in Lund.

At the division of CAAD at the School of Architecture in Lund we are convinced that the use of computers means literally adding users and users activities to the design. Drawings and physical models usually leave the dynamics of life to your imagination. We have shown in a research project called Computer aided participatory planning that it is quite possible and interesting for the users to visualise user activities in animations etc.

The CAAD design program is also strongly influenced at the BAS*CAAD research project, which is run by the CAAD division in Lund stressing the fact that architects’ designs consist of both technical and human systems in the same process.

The development of CAAD education and training at the School of Architecture continuously makes new steps trying new ways to act. Searching for better CAAD systems engages research as well as practical experiments in and outside the CAAD education. Until now 3D modelling programs are primarily designed for the designers immediate analysis of a solution. For handling several images and other information to support analysis in a wider sense we have tried to use multimedia-like programs.

At the School of Architecture the curriculum for the 3rd and 4th year is dominated by problem oriented “design projects” which occupy 2/3 of the students time for the term. The students can choose from 6-8 programs each term and they work with different problems and angles of architecture. Having only four possible projects, choosing one for CAAD is a strong indication.

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Most CAAD courses are optional in the 3rd and 4th year and are run parallel in time with the programs. They are very popular but cover only up to 50% of what is asked for. This means that the CAAD design project 1996 had to include quite a lot of plain skills training of the computer programs. Description of the CAAD design project 1996.

Description of the CAAD design project 1996

Tutorial input and activities:

- Presentation, stressing the problems above.
- Two teachers continuously instructing, argumentating and discussing about the design work, computer programs and machine problems etc. Introducing “Educating the reflective practitioner” by Donald Schön for reading and a seminar discussion. Both as a principle way of teaching and an example of a way to conduct clients.

Pedagogical method:

- Students are to choose a client with a realistic design problem. The design is to be developed with the student continuously reflecting over the problem/process.
- Tutors’ role more like a ”coach” than traditional ”professors”. Group meetings every Monday morning.
- A Macintosh computer environment with 8 PowerMacs and the rest Macintosh II was used. Color scanners and laser printers were at hand. For modelling ArchiCad 4.55 student version was used and for image storage and presentation Macromind Director version 3.0. For image work Photoshop version 3.0 was used and for special effects in rendering Artlantis Render for ArchiCad.

Principal schedule of activities:
Working time was Monday and Tuesday full time and Wednesday halftime for 16 weeks.

- Introduction

- Computer program courses, Macromind Director and ArchiCad
Starting with an image presentation program, Macromind Director version 3.0. Image archives at an early stage to improve the critics of what images should look like. 3D modelling and rendering in ArchiCad.

- Seminar on ”Educating the reflective practitioner”
- Individual choice of design object - short written description
Most students chose a client with a

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more or less realistic building problem, such as a new or addition to villas or summer houses. Some were rearranging a ware-house, addition to a summer restaurant, a care home for disabled children, a gambling café ...

- **Computer visualisation of user activities, site and reference designs.**
  Photos of ourselves to be actors in our images.
  Photomontage in Photoshop and Macromind Director

- **Design and computer modelling**

- **User contacts**

- **Presentation and discussion with the coach and the rest of the design group.**

- **Design and computer modelling**

- **User contact**

- **Presentation and discussion with the examination group.**
  The design program leader is by rule supported by a group of collegians for examination

- **Design and computer modelling**

- **User contacts**

- **Perliminary presentation to the coach.**
  Discussing with a video producer about directing video for better understanding of walk throughs.

- **Designing a presentation**
  Playing with Artlantis rendering program with light and textures
  Presentation with two screens - one for the presentation the other for orientation.

- **Final presentation and examination.**

- **Evaluation of design program**
  Presentations assembled on a CD-rom.
  Group discussion
  Questionnaire.

Experiences from the process.

Some of the students had chosen the CAAD design program to really have to tackle the technique and get assistance doing it. After a close coaching in the beginning at the end there
was just left some anxiety caused by the lack of selfrelience.

All students found the use of CAAD modelling very helpful for introspective use in the designing. Especially the three dimensional viewing called for a more thorough penetration of the design and this explains why all students made a lot of their own library objects. It was difficult to use for the first sketches but as soon as there was something like a building it was easy to build a model and to go on building, rebuilding and modifying it. It takes some time though to understand that things on the screen do not have to be taken literally. The same actually as you use your own "code" when you sketch by hand.

In these design projects one of the essential goals is to get the students active and support their initiative. Therefore the students themselves could choose their own client and design project. It was then natural that all student-client contacts were taken by the students. On the other hand the teachers had to have their main information about the clients through the students.

The first design, a "multimedia" production, presenting the user activities and some reference images was carried out with fantasy by most students. A few had problems in understanding how to visually describe something they are used to get written. The reference images were used to test users taste of atmosphere and expectations of the design. It was also presented at the final presentation and in some cases the positive influence was quite obvious.

All students got deeply involved in their design and most client"s responded in a constructive way. All clients were thrilled by the possibilities and have had influence on the results. The clients were invited to take part in the final presentation but no one had the time to come.

The students engaged in the questions about visualisation for themselves and the client and made tests consciously. With entusiasm they went about to find out and fullfill the wishes of their clients. So in the end everyone had his/her own experiences to use in the evaluation discussion and questionnaire.

The students' impressions are that they can better support clients understanding by using CAAD. Clients and architects see things differently. Quite naturally clients are sensitive about the atmosphere of the image due to colours and surfaces. They are more interested in interiors and garden than fagades. A very catching view is taken from inside an important room looking out of the window ! Another experience is that images with people and furniture are more appreciated than the "tidy" ones.

Artlantis rendering program was given to us by the dealer to test and some students used a lot of time playing with it. Out came some good images where especially light was used with added value. And some bad images where the
student had been to thrilled by the technique to use his taste as an architect. Luckily there is always Photoshop to make corrections.

Walk-throughs is one of the features everyone connects with CAAD. What is a walk-through for a client? It is quite similar to a video film. To get some experiences from directing video we visited a video producer and got some very thinkworthy input, such as; the aim of a video is to tell a story; change of views must be understandable; avoid zooming and panorising - it is not always understandable and comfortable for the viewer; people are more interested in in the average person than houses. If you want to show a building on video - tell the story of some one "walking through" the house visiting the important places.

Presentations had to be made in a multimedia like environment with possibilities for a user to "clicking" his own way around in the material. Most students by good work gave themselves time to investigate the possibilities and some very nice presentations were done. One of the problems is that even if you are ready there are always some little details to make better.

For presentation a few students used two computers each with a LCD screen on a overhead projector. The second screen was either used for adding orientation plans to the perspective views or just to show two images at the same time.

To the final presentation there was a lot of influence of old experiences! Only a few students managed to make the presentation really using their excellent images "telling the story of the design". The usual was presenting a design from the plan projection, finishing with the most informative images and so on.

Most students followed the time scheduled and could present an acceptable design for examination. The examination group of collegians consisted of 2 teachers and 2 practitioners, all architects. The principal discussion within the group was about which complexity an acceptable design should have as some students had chosen an extension to a small house. Especially the teachers meant that even though a small building has complexity it is important that even a CAAD design program must be challenging to a 3rd or 4th year student. Also, we do not want CAAD design to be associated with too simple projects.
Discussion - from the teachers’ point of view.

**Authentic users in education programs**

As expected the confrontation with authentic users made an impact on the students. Users, in this case also the clients, did not behave as expected. They were impressed by the technique and they were therefore easy to reach. Visualisation is and was regarded as an important improvement for users, but the students were a little surprised how much their own reaction on the images differed from the clients. Traditional drawing views were of little interest. This does not mean that clients do not want to get an overview or know from where views are taken! We have to try combinations of perspective, axonometric or plan views. One of the real drawbacks with Quicktime VR is that it cannot be combined with a second view showing dynamically where and how you are moving.

Some students and clients obviously let themselves be blinded by the power of the media and dropped there ”critical eye”. This happened despite repeated warnings from the teachers, which implies that there is a deeper problem to deal with.

In the communication with the client the students knew more about design. This was a new situation to them. All students think that there was a lot to learn from this.

**Architects introspective work gets added value also in education**

All students found that the use of CAAD modelling gives added value to designing. They also mention the possibilities to create a better communication with clients and others in the building process as an advantage for themselves. For them the project obviously has given a lot of new views on CAAD.

**Computer program training and design practice**

The examination group had views on the lack of complexity in some of the students designs. We would like to teach the principal CAAD through out the design process to be able to demonstrate an overall concept. As time is very limited in the architecture school’s curriculum we have to practise on a small building. Naturally this ought to be at a stage when a small building is a challenge to the student. The individual design projects differed a lot in complexity which has to do with the choice of client and the choice of an interesting design project. In this CAAD design project no student has shown any reaction against a lack of challenge, probably because the process has been such an interesting part.

In spite of a full term of influence from the CAAD teachers, when it came to what was looked upon as the most critical point, examination, students went backwards to old presentation manners. This indicates that traditional teaching is successful already after two and a half years, and that it takes more time and practise than a term to get students out of that track. The conclusion must be that we have to start a discussion about presentations with our collegians in the other design subjects.

It is important to be aware that teaching CAAD is both skills training i.e. learning the computer commands and what they do, and design knowledge i.e. how to use the capacity of the computer program for design. The first can be done by training with assistance and selfinstructing manuals. The other must be taught by ”Reflection-in-Action”. The limited time of one semester is not enough to give the student a real chance to learn enough. Especially the design knowledge must be practised in more design projects where the use of computers is only a minor problem. For this we need ”coaches” with their own experience of CAAD in practice. How do we get that when today CAD-practice by making drawings mainly is the only practical experience you can get?
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