

# **VISUALIZING WITH DIGITAL TOOLS**

## **Endoscopy versus Computer Modeling**

*Hannu Penttilä*

Tampere University of Technology  
Department of Architecture

This approach sees traditional video endoscopy and computer-based modeling techniques as two methods whose combination gives advantages for both. Endoscopy and computer based tools are not alternative nor rival techniques.

New digital visualization possibilities are available within the context of CAD- systems. High-end and more expensive visualization has gained influence from commercial advertizing and also from entertainment industry.

Traditional endoscope video has longer historical background and it's roots are in model photography, model-based simulations and video techniques.

The main focus of this paper is to describe Tampere architectural department's computer based visualization facilities briefly with two cases studies. Our status and resources in traditional simulation have been rather good since mid 70's, and now when also the basic digital facilities (word processing & CAD) exist, it will be our next challenge to deepen and develop the variety of available simulation methods, equipment - and naturally knowledge in combining them.

### **COMPUTER BASED VISUALIZATION**

CAD-system development for micro-computers during late 80's, has made it possible to use CAD-data (which means drawings) as a basis for a bunch of modeling, animation and visualization software.

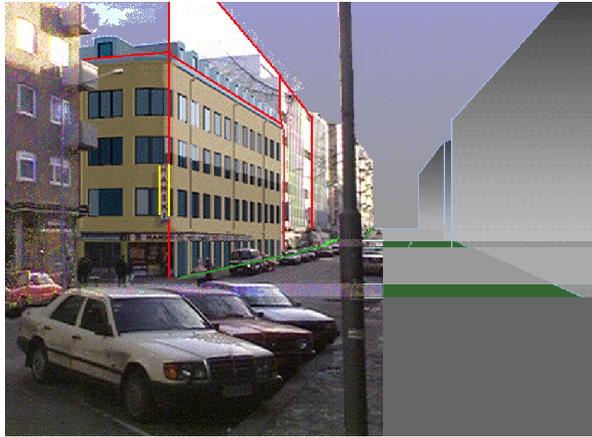


Figure 1



Figure 2

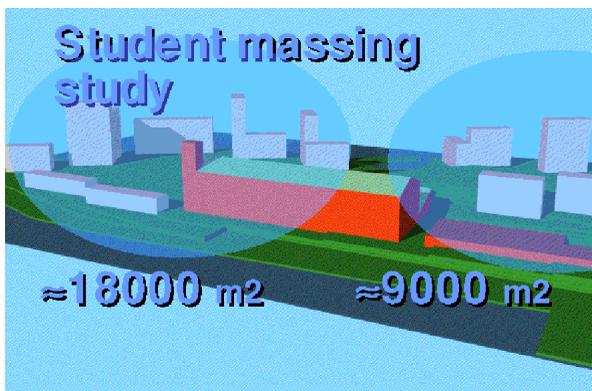


Figure 3  
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In visualizing urban environment and architectural designs of various scales with micro-based systems, will be my target, since it is available for architectural practice with reasonable expenses. Although university environment could use more expensive and fascinating hardware and software platforms, architectural offices hardly use them.

### **MODELING AN EXISTING BUILDING — DEPARTMENT OF ARCHITECTURE CASE STUDY**

We created a CAD-model of our department building for drawing maintenance and facility management purposes. The objective was originally to obtain all necessary drawing material - for future changes, interior layout, etc. from a single CAD-model.

Maintain one CAD-model and your visual database will be up to date with the changes to come, the CAD-experts said. A promising idea to produce various documents from a single model proved to be true; outputs have so far been:

- Drawings for different purposes and different scales
- Area calculations and quantity lists from floor plans
- Still model images from various viewpoints
- Interior and exterior model animation to create space illusion

### **MODELING URBAN ENVIRONMENT — LAPINNIEMI CASE STUDIES**

Lapinniemi site locates 2 km from Tampere downtown, and it has been used on urban planning courses by professor Jere Maula. The main concern has been to introduce planning methods to communal decision makers and active citizens.

Several available environmental simulation methods have been used mixed in these rather short one week courses:

- Traditional scale modeling - cardboard & glue
- Sketches & Photos

- Endoscope & Video
- CAD-modeling

The CAD-modeling objective has been to model student group ideas quickly and roughly, to jump into environmental analysis as soon as possible. Usually computer-based tools tend to require most of the time used in architecturally irrelevant technical topics, hence we used a CAD-expert in modeling, and forced students to work with their main interest - the environment.

## **EXPERIENCES AND CONCLUSIONS**

In our visual education, a computer has been - and always should be - used as one possible visualization tool; not THE tool, but one available if needed.

With computing-aid it has been easy to combine existing visual material, such as photos, maps, and hand-made drawings, with CAD-models. Most helpful has been image manipulation in cut & paste kind of "digi-montages".

With CAD-models it is also possible to demonstrate several kinds of changes in environment:

- Alternative planning & design solutions
- Movement outside and inside the buildings
- Growth and demolish of environment

One of the main drawbacks in using CAD-tools, has been the difficulty in recognizing the size and scale of designed environmental objects.

With low-cost tools it is rather clumsy to model natural objects, such as vegetation and terrain, unless cut & paste from still images is used.

To be honest, it is expensive to model the environment very detailed, since detailing requires lots of manual work.

Resources also limit the use of new digital tools; it requires expert user skills and special hardware & software - even in micro-computers. Despite the promising possibilities, CAD is still unfortunately a highly techn-intensive tool.

## **MENTAL BARRIERS — THE HIGHEST FENCE**

The most severe limitation in using new digital media and tools — despite the good and bad features of them — is the human mind.

Computer is commonly understood to be equivalent to CAD, but it is not. Computers offers a wider spectrum of tools for different purposes. CAD is commonly understood just as a drafting tool, but it is not. CAD offers a wider variety of spatial manipulation and visual tools. This "common knowledge" very often dooms digital tools without asking and without further information.

The university faculty - professors, teachers, assistants and students - naturally prefer traditional methods since they know them, and learning new, always requires extra efforts, which human beings try to avoid. Students are usually more flexible and adaptive to new ideas and possibilities.

Most barriers and limits are not technical kind, but they are created in our mind.

## **HOW WE HAVE DONE IT ?**

Rough estimation about the time used in pure technical aspects and actual environmental issues or architectural aspects is rather disappointing: non-environmental support, techniques 80%, simulation substance 20%. Time used with: modeling software 80%, image manipulation software 20%.

Because students tend to use very much time in detail level CAD-modeling, without having any significant gains or advantages to environmental simulation, we urge them to model quickly and spend the most time with design quality aspects.

