



**From media work in the educational  
training of architects  
to experiences with the postgraduate  
course „Architecture Media Management“**

Harald Gatermann  
FH Bochum, University of Applied Sciences  
Germany

## 1. Introduction

The perception of space, geometry, material and the influence of light is one of the core items of undergraduate courses in architecture.

In Bochum we developed and still practise a consequent system of integrating drawing and photography as analytic tools of perception and sketching, descriptive geometry, computer aided design, digital visualisation and animation as synthetic items.

The versatile use of digital media in the further studies is of essential significance - especially the synthesis between architectural photography (with all its special features concerning geometrical depicting) and CAD / visualisation / animation.

Special emphasis is given to techniques for simulation and immersion such as digital panorama photography, combined with computer-based vr-modelling e.g. vrml as well as using online-cad-modeling and arial photography in processes of citizen participation.

FH Bochum UAP was one of the first schools of architecture in Germany converting to the new european two-cycles systems of higher education, offering a bachelor course and up to three master courses: architecture, town planning (together with architecture schools in Siegen, Cologne, Dortmund) and, unique in Germany (and the rest of the world) a masters course in „architecture media management“.

„architecture media management“ is based on two columns:

- interface between architecture (eg. in architectural offices, firms, institutions) and the public (using print media, tv, advertisement etc.)
- managing and archiving digital (and analogue) media in architectural offices, firms, institutions.

The curriculum consists of courses in professional architectural photography, dtp (desk top publishing), layout, webdesign - but not with the aim to get specialised in these fields, but to get the knowledge of professionals and of preparing and developing strategies in using professional methods. It also consists of courses in scientific methods and historical streams

(„history of media design“) as well as basics in business administration or in rhetoric and intercultural communication.

Two practical projects in the field of media management bring together the different items of the lectures. Visiting and analysing fairs like the Expo Real or MIPIM are perfecting the contact with practise.

The master theses of the last three years show the wide variety of interesting new ways of finding the bridge between architecture and the public / real estate / industry / institutions / printed and online media.

## **2. Research and teaching**

The role of a teacher at a university is influenced by his personal skills, interests and experiences, combined with the needs of the faculty and the curriculum (which itself is due to changes from time to time . . .)

As an example i would like to describe my own approach as a possible example in the field of using photography as a medium of presentation and simulation.

My personal impact is influenced by:

- experiences in my own time at the university (photography, endoscopy)
- eye-level-photography using SLR-cameras with wide angle lenses
- research projects in the field of cad and visualisation

The field of research of a teacher is defined by his personal interests, talent, but also the circumstances of his education, practise, projects, clients etc.

while the field of teaching depends on the curriculum, defined by ministries, faculties etc.

The intersection of both could be defined as „personal teaching“.

The field of teaching, defined for my person, was design, construction and computer aided design. In the first year I was building up my personal curriculum in this field. Especially for teaching CAD we developed a ten-step-program, which was very successful and accepted by the students.

Even in the field of training the personnel of architecture firms this kind of structured program had a positive acceptance.

A short description: it was a course of 10 lectures, starting with the user interface, layer-structure, creating and editing of 2D-structures, creating and editing of 3D-objects like a garage-building, the rietveld-chair, a Mies-van-der-Rohe pavillon, the Walser-House by Luigi Snozzi.

The 10-step program was the basis for learning the principles of CAD with the software, we offered to the students (at that time RIBCON, a CAD-software developed in Stuttgart, Germany - unfortunately with little response in other countries).

In the next semester we asked the students to transfer this 10-step program to another software (Archicad, Allplan, Autocad). This method has great relevance for practical work of the students, who have different phases of practical work or internships, where they find different software and have to deal with that software in a short time.

On the other hand this method intensifies the understanding of principles, typical for CAD-software (e.g. vector-graphic, layer, creating and editing) and individual features of different CAD-software.

This method of a ten-step-program, by which certain 2D- and 3D-objects are created, is still used in our lecture, even when the CAD-software, we use in the first semester, is no longer RIBCON. Instead we use Archicad as our choice for beginners and Allplan as our choice for the second semester and for more sophisticated applications.

## **Teaching research**

We evaluated this method of teaching and developed a booklet and a Tool-book-e-learning-lecture, which was presented at the Leipzig book fair in 1997.

The response from users of the Ribcon software was also very positive, because there was no tutorial, published as a book, before.

## **Hypermedia**

Apart from the field of teaching we were pioneers of combining 3D geometrical data from planned or realized buildings for terminal-based information systems. Here we also used Toolbook as authoring software. The applications reached from information systems for our own university to museums and exhibitions. It was the time of the first 19“-touchscreen, available for Windows 3.1 PC´s !

The year 1994 brought the order to develop an online-information system for the btx-system of the german telephone company (analogue to the very popular minitel-system in france). It was one year before the world wide web was introduced in the public scene in Germany (which was in spring 1995). Before that time there were proprietary systems like Compuserve - the internet was mainly used in the academic and scientific world up to then.

## **Internet**

Even if it was not popular and not necessary for our core field of teaching (CAD), we were eager to see what was possible in the world wide community of online users. We introduced one of the first internet-portals for architects on Sept. 1st, 1995: [www.archinet.de](http://www.archinet.de)

By this means we suddenly were the pioneers in the architecture scene and were asked to consult a lot of firms and publishers.

## **Quicktime VR**

The circle was closed with the introduction of Quicktime VR by Apple: again it was the combination of different media: internet and photography. We were so fascinated, that we ordered and used all available equipment, which was necessary at that time to produce QTVR´s in panorama- and object-mode.

## **VRML and Real-VR**

On the other hand the invention of VRML brought new ideas: visualisation of cad-data via the internet, cooperative working and design, futuristic ideas of developing virtual communities and cities by creating 3D-objects (and avatars).

All of those inventions and introductions of new technologies were taken to the lectures and seminars. By this means the lecture had to be „updated“ every year.

In the shadow of VRML Eric Chen, the creator of QTVR at Apple, developed a more open system with more functionality: Real-VR, which is based on VRML 2.0.

We developed a tutorial for VRML and got the order for a research project named „Immersive techniques in architecture and building science“.

### **2.1 Research in the field of media works - short overview**

To show the personal items in the field of media works, i will shortly describe some key projects, all as an intersection between CAD and other segments of architecture and design.

I assume this kind of self-reflection is representative for colleagues and documents a typical career as academic teacher in these times (last decade of the twentieth century)

Research can also mean research in the field of teaching and developing didactical concepts.

2.2 Research project „autotektur“

2.3 Research project „HIT“

2.4 Research project „immersive techniques in architecture“

- 2.5 Research project IMLAB, aspect „collaborative design“
- 2.6 Research project IMLAB, aspect „media database“
- 2.7 Research project IMLAB, aspect „academic network“
- 2.8 Research project IMLAB, aspect „tools and methods in the age of digital media“
- 2.9 Research project „citizen participation in planning“
- 2.10 Research project „standardised CAD Tutorial“
- 2.11 Research project „standardised APG Tutorial“
- 2.12 Research project „standardised APG Parcours“



**Figure 01:** Aerial view of Meckenheim - the green area is the base for planning alternatives



**Figure 2:** Simulation by combining cad and photography - visualising one of the planning alternatives

### 3. Teaching CAD and architectural photography in the first year

The perception of space, geometry, material and the influence of light is one of the core items of undergraduate courses in architecture.

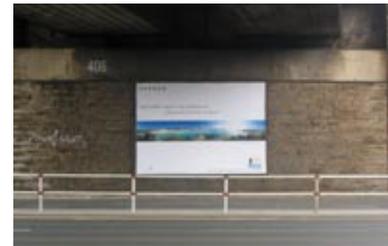
In Bochum we developed and still practise a consequent system of integrating drawing and photography as analytic tools of perception and sketching, descriptive geometry, computer aided design, digital visualisation and animation as synthetic items. (1)

Students, coming to the university, have to learn different subjects at the same time: construction and design, drawing and drafting, descriptive geometry and computer aided design.

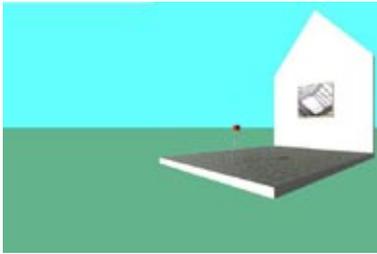
Especially descriptive geometry and computer aided design show a lot of parallels. A third item is architectural photography. In Bochum we use especially the photography as a kind of catalytic converter for teaching the principal aspects of both, geometry and cad.

Students regularly own a digital camera, only a few still have deeper knowledge of analogue reflex cameras. So we developed a 10-step-course of taking pictures in a systematic way:

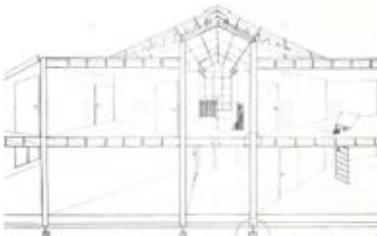
Exercise 1: Beginning with a 2D-object, an advertising panel, students learn to understand the principle rules: the 2D-object has to be parallel to the film plane to get an orthogonal picture as a result. Here the analogy to cad begins: we simulate this exercise in a cad-model. This gives insight to 3D-cad-software and principles of constructing 3D-objects. By putting a virtual camera as a 3D-object into a cad-model, we can simulate the role of the point of view, the direction of the lens, the inclination of the camera, the alternative views by changing the focal length of a fixed lens or a zoom-lens. After this first exercise on both media (photography and computer aided design) a lot of principles of both worlds have become clearer and allow the first immersion into a scenario of simulation, which is essential for the further study program.



**Figure 04:** Advertising panels as object for photography and CAD.



**Figure 06:** The photography of an advertising panel - simulated in a „mock-up-studio“ in CAD

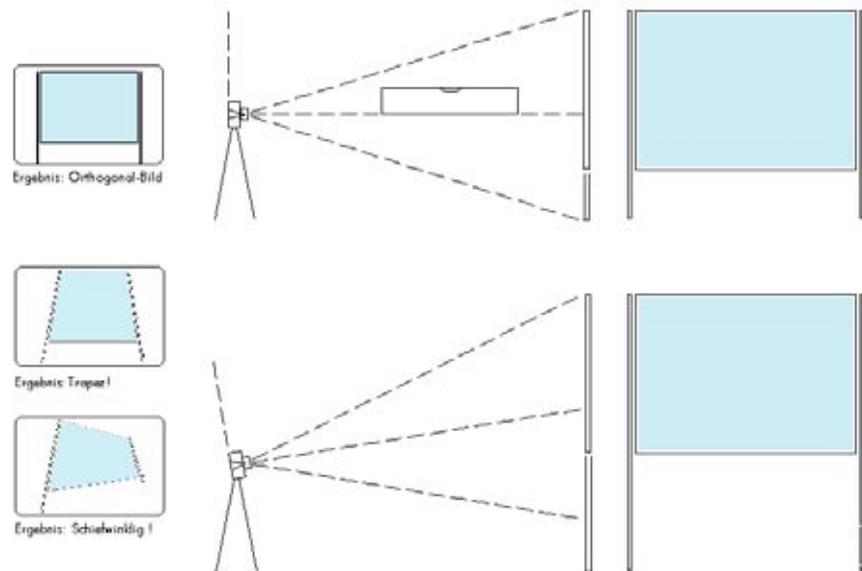


**Figure 03:** This drawing by a first year student shows lack of perception of perspective

The further steps of the 10-step-course can be found in Figure 07 (or as web-based course: <http://www.fh-bochum.de/fb1/gat/apg>).

One of the principals of the photography-course: the students have to take their pictures, see all the difficulties they have and afterwards the difficulties are subject of the next lecture or seminar. In the seminar the students use their mock-up-studio on the computer-monitor: they have to construct a cad model of the real-world-scenario, where they took their photograph. In this cad model they can easily change all influence-factors and simultaneously the result of their decision.

At the end the students reach different didactical results: improvement of their way to use a camera, improvement in their manner to interact in a simulated 3D-world, more interest in constructing 3D-objects in cad.



**Figure 05:** The position and direction of the camera influences the result.

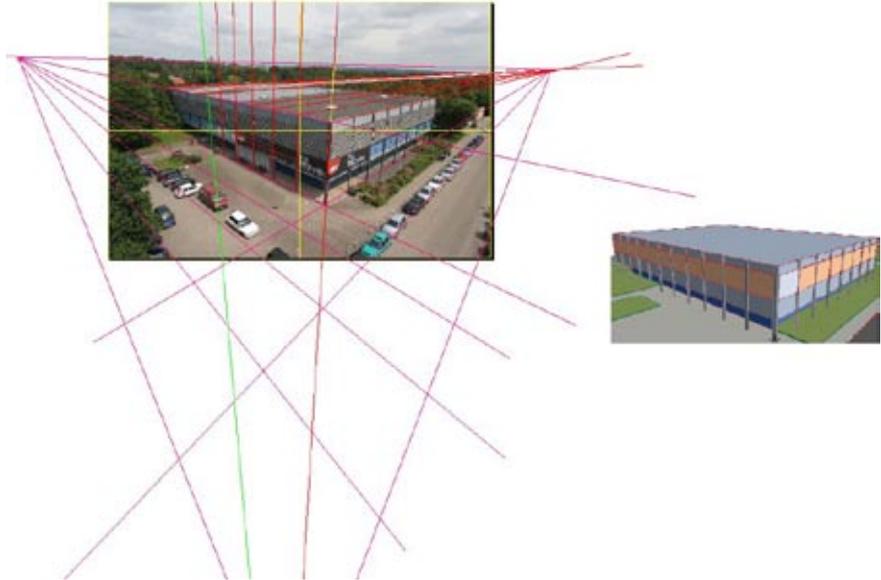
Architectural Photography	Computer Aided Design
0. equipment, history	0. user interface
1. 2D-object: advert. panel	1. 2D-sketches
2. 2D-object: facade	2. 2D-plan
3. photo-software	3. 2D-editing
4. 3D-object: corner	4. 3D-principles
5. 3D-object: XXL	5. 3D-sketches
6. 3D-object: XXH	6. 3D Mies Pavilion
7. lenses: wide angle / shift	7. 3D Rietveld chair
8. central perspective	8. 3D Snozzi House
9. natural + artificial light	9. layout

**Figure 07:** *Modularised courses in architectural photography („apg“) and computer aided design („cad“) for first year students*

To close the didactical bridge to descriptive geometry: the students have to analyse their digital photographs by graphical methods directly on the screen. By this method they intensify their consciousness of photographic principles as well as for the understanding of vanishing points and other principles of the descriptive geometry.



**Figure 10:** The middle of the picture is marked by two diagonals: here it shows the point of view with a tilt camera



**Figure 08:** Analysing a photography by filling in the vanishing points and controlling the data of the camera (point of view, height, angle) with those of the cad-model



**Figure 09:** The middle of the picture is marked by two diagonals: it shows the height of the untilt camera and marks the horizon

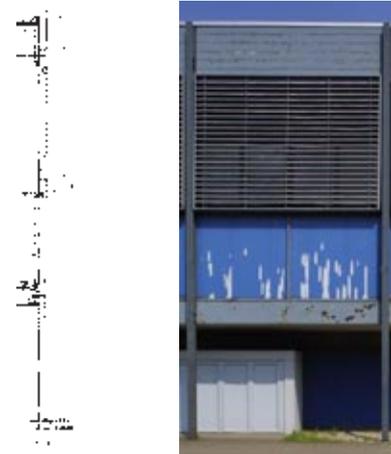
#### 4 Teaching CAD and architectural photography in further years

On the next level (in the second year) students learn how to use digital photography in the sense of photogrammetry, i.e. to get measurements out of a digital photograph - either directly by counting the pixels or by import to a cad-software.

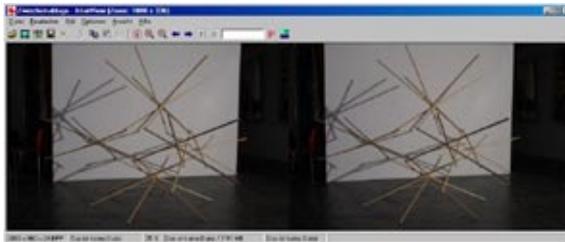
Also many students take photographs from materials and facades to generate their own material-catalog for cad-visualisation.

Special emphasis is given to getting in touch with stereo-techniques in photography (taking pictures and visualise them by anaglyphs using web-java-technology - the stereo-plugin by petersilk) and also in cad, by creating perspective views from two parallel points of view.

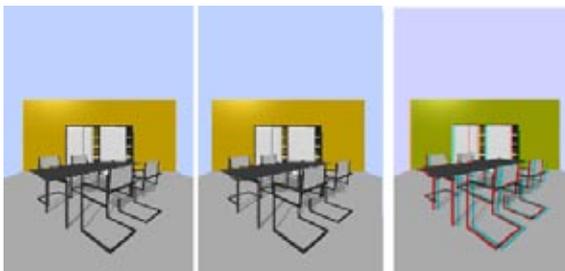
Students are also interested in learning and using the techniques of photographing design-models in simulated eye-level - using natural background and lighting or artificial one.



**Figure 11:** *Photography of a facade as base for digital measurement*



**Figure 12:** *Stereo photography as a medium for finding new ways of perception and as a medium for documentation of three-dimensional installations*



**Figure 13:** *Pair of stereo sights as a result of cad-visualisation*



**Figure 14:** Design model photographed from simulated eye-level

Other more sophisticated methods like panorama-photography or VRML are subject to seminars.

Both methods of creating digital panoramas are used: the stitching-methods (possible with standard digital cameras) and the scanning method with professional digital scanner cameras, such as the Spheron camera.



**Figure 15:** Highly professional camera equipment: the digital scanner panorama camera SPHERON, directly connected to a notebook.



**Figure 16:** Combining photography and cad-visualisation for immersive environments in VRML

## 5 Master course „Architecture Media Management“

The classical job of architects has changed in the last years. It has become more and more important not only to offer the classical facilities, but to open the field of activity in a broader sense.

The FH Bochum university was one of the first schools of architecture in Germany converting to the new european two-cycles system of higher education, offering a bachelor course and up to three master courses: architecture, town planning (together with architecture schools in siegen, cologne, Dortmund) and, unique in germany (and the rest of the world) a masters course in „architecture media management“.

„architecture media management“ is based on two columns:

- interface between architecture (eg. in architectural offices, firms, institutions) and the public (using print media, tv, advertisement etc.)
- managing and archiving digital (and analogue) media in architectural offices, firms, institutions.

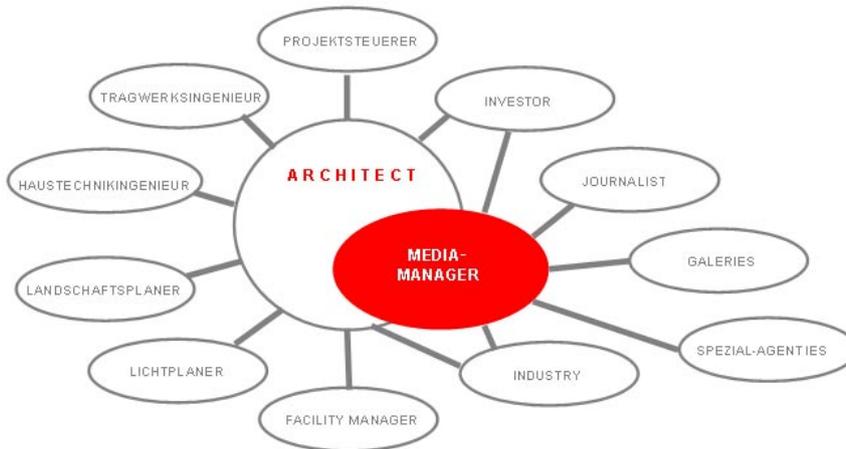


Figure 17: Architect and Media manager

The interest in the system is enormous: more than 100 architects are interested in this programme every year - from all parts of Germany and the German speaking countries (up to now the programme is only offered in German due to the intensive part of formulating highly sophisticated text for press and media). That gives us the chance to make an entrance-qualification-test. The capacity is 20 students per year. In the meantime we had 3 years of experience with this one-year-course. It is absolutely positive: the students (and lecturers) are highly motivated, the results are of extraordinary quality and nearly everyone gets a new job or a better position in the firm or office where, he/she has worked before.

<b>Architecture Media Management (Master Course)</b>
Modul 1: visualisation (CAD, photography) + layout
Modul 2: projects + presentation
Modul 3: communication + strategy
Modul 4: office- and data-management
Modul 5: media-history + scientific methodology
Modul 6: master thesis

**Figure 18:** *Moduls of the master course*

## 6 Conclusion

The consequent use of digital techniques from the first year is the base for future-oriented teaching, which is necessary for students during their studies but also for their ability to be professional and versatile teamplayers in architects offices and their future jobs.

Not only in the field of teaching but also in the engagement in research digital media, especially the combination of cad and photography are in the focus in Bochum.

The main focus of the masters program is to be a connector and communicator between the classical architect and the world of media, press and industry. In this case the management of digital media is more important than the depth of versatility in producing media.

## 7 References

(1) Gatermann, Harald (2004) The Didactic Triangle - Using CAD, Photography and Descriptive Geometry as Educating Tools with Mutual Influence, Architecture in the Network Society [22nd eCAADe Conference Proceedings / ISBN 0-9541183-2-4] Copenhagen (Denmark) 15-18 September 2004

Gatermann, Harald and Czerner, Juergen (2003) Modular E-Learning-Environment for Architecture, Digital Design [21th eCAADe Conference Proceedings / ISBN 0-9541183-1-6] Graz (Austria) 17-20 September 2003, pp. 199-202

Czerner, Jürgen and Gatermann, Harald (2002) Modeling and Rendering Virtual Architecture by Using Fisheye-Panorama-Based Images and Lightings in HDR-Quality , SIGraDi 2002 - [Proceedings of the 6th Iberoamerican Congress of Digital Graphics] Caracas (Venezuela) 27-29 november 2002, pp. 172-174 <http://cumincad.scix.net/cgi-bin/works/Show?0653>

Czerner, Jürgen and Gatermann, Harald (2002) Modeling and rendering virtual architecture by using fisheye-panorama-based images and lightings in HDR-quality, Connecting the Real and the Virtual - design e-ducation [20th

eCAADe Conference Proceedings / ISBN 0-9541183-0-8] Warsaw (Poland) 18-20 September 2002, pp. 569-571

Gatermann, Harald and Czerner, Juergen (2001) MESA: MODULAR EDUCATING SYSTEM FOR ARCHITECTURE, SIGraDi biobio2001 - [Proceedings of the 5th Iberoamerican Congress of Digital Graphics / ISBN 956-7813-12-4] Concepcion (Chile) 21-23 november 2001, pp. 221-223

Gatermann, Harald (2001) First step to augmented reality: Combining vrml and pano-photos, CAADRIA 2001 [Proceedings of the Sixth Conference on Computer Aided Architectural Design Research in Asia / ISBN 1-86487-096-6] Sydney 19-21 April 2001, pp. 219-230

Gatermann, Harald (2000) From Vrml to Augmented reality via panorama-integration and eai-java, SIGraDi'2000 - Construindo (n)o espacio digital (constructing the digital Space) [4th SIGRADI Conference Proceedings / ISBN 85-88027-02-X] Rio de Janeiro (Brazil) 25-28 september 2000, pp. 254-256

Gatermann, Harald (1994) Using Hypermedia as a Teaching Tool in CAD Education, The Virtual Studio [Proceedings of the 12th European Conference on Education in Computer Aided Architectural Design / ISBN 0-9523687-0-6] Glasgow (Scotland) 7-10 September 1994, p. 211