Architectural-IT and Educational Curriculumns – A European Overview

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The paper summarizes the analysis of data on european architecture schools, collected in the eCAADe-conferences during the 1990s. Computer-Aided Design has developed into architectural information and communication technology (ICT), to become commonplace in architectural education. However, the general held views on new media use in the schools seems to be slightly optimistic. On the other hand, the invisible more common ICT use (writing, surfing, emailing) accounts for a lot more of the volume of activity than generally appreciated.

The major hardware platform in european architecture schools is PC/Windows (90-95%) with Linux and Unix commonly used in servers (25-35%). Macintoshes are also widely used (50-55%). MS Office (90-95%) and PhotoShop (85-90%), are used widely in the schools. The Graphic and DTP tools PageMaker, QuarkXpress, Illustrator, Freehand are also common (30-50%). AutoCAD is the market leader in CAD platforms (80-90%), followed by ArchiCAD. MicroStation/Bentley also has a significant presence in the schools (35-40%). 3DStudio is the most common 3D-modelling tool (80-85%), followed by formZ (35-40%). Less common (15-25%) are Rhino, Maya, Alias, Lightscape and Radiance.

1. Introduction

Architectural ICT-education has been a constantly changing discipline during the last 20 years. The tools and techniques used in Computer Aided Architectural Design (CAAD) have become components of an architectural Information and Communication Technology (ICT) environment. Computing and new media have also become the main tools for students in the majority of the European architecture schools.

The extent of this study reported here is wide-ranging. In scope, it covers all the european architecture schools and includes:

- 200 european architectural schools in more than 30 countries.
- Approximately 120 000 architectural students.
- Approximately 5 000 full-time teachers.
- Approximately 50-70 000 courses given yearly in these schools [1].

The material for this study has been collected with participant questionnaires in eCAADe-conferencies in Helsinki 2001 and Warsaw 2002 by the eCAADe-secretariat, and with a documented web-survey [2].

► Figure 1. European schools of architecture – schools active in the eCAADe region. Schools are marked with symbols, size indicating activity.
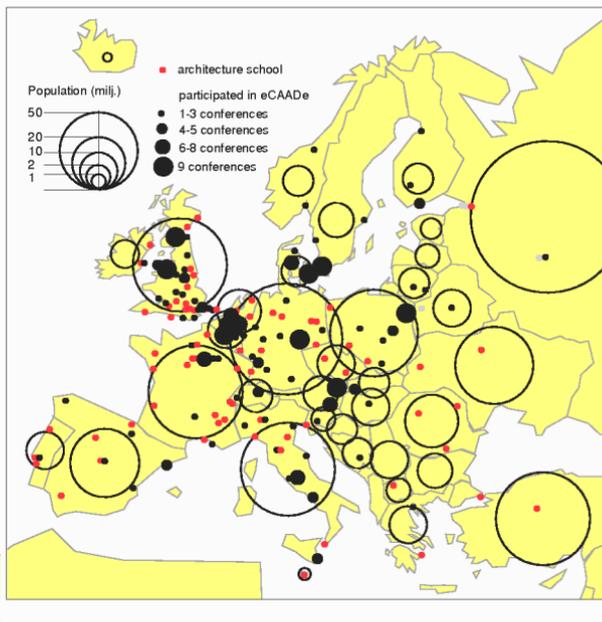
2. Objective

The main objective for this study is to establish the relationship between university level European architectural education and so-called new media, that is, digital technologies and the tools they offer to architectural users. The key questions of the research are:

- How widely are the modern digital media, methods and tools used in the schools?
- In which ways, and how, are digital media used in the architectural education throughout the curriculums – not only in CAAD-education?
- How are modern media integrated into the traditional architectural education regime?
- What kind of changes has the evolution of digital technology in fact caused in the educational environment within architecture?

This study is in response to a perceived need to give an understandable and measurable overview of the state-of-the-art of current architectural education and its relation with new media, ICT and CAAD.

Another important objective is to help facilitate the potential connections and information channels between the European architectural schools.

3. Hypothesis

A strong motivation for this work is the assumption, that new media use, as seen and well-documented in discipline-specific conferences like those held by eCAADe, CAADRIA, ACADIA and SIGRADI, may not properly reflect the typical new media use and understanding within the architectural schools in general.

There are schools with well established CAAD-reputation and there are lots of well described examples of sophisticated new media use, which are accumulated in these forums, and which are also well documented into the (currently digital) literature of the area, such as in the CUMINCAD-database [3].

It is useful, however, to describe the 'invisible' the more every-day use of new media in order to describe the whole spectrum and variety of ICT use in the European architectural schools, and not limit this study to the most excellent or best documented examples of the ICT-active schools.

4. School activity

The participant activity in the eCAADe conferences has been relatively stable during the 1990's (Figure 2). There has also always been a quite active participation from outside Europe, mainly from Asian and North-American countries (Table 1).

► Figure 2: Participant
activity in eCAADe-
conferences.

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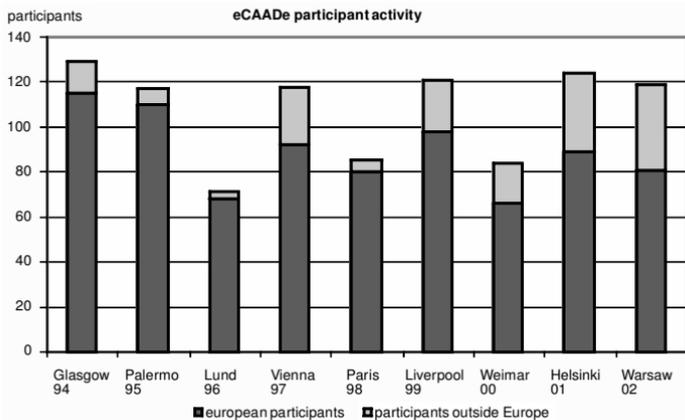
► Table 1: Participating
nationalities in eCAADe –
Helsinki 2001 conference.

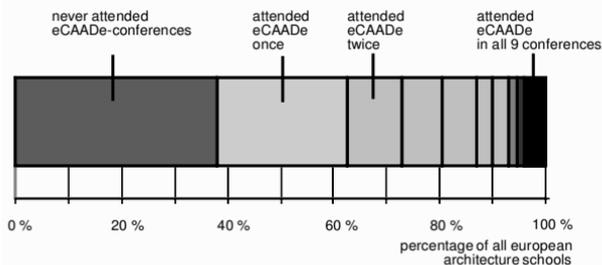| Europe and Near-East	65	70 %
Finland	12	
UK and Scotland	11	
The Netherlands	6	
Denmark	5	
Germany	5	
Poland	5	
Austria	4	
Sweden	4	
Belgium	3	
Italy	3	
France	2	
Lithuania	2	
Greece	1	
Hungary	1	
Israel	1	
Asia and Australia	14	5 %
Taiwan	5	
China/Hong Kong	4	
Australia	2	
Japan	2	
Indonesia	1	
North-America	10	10 %
USA	8	
Canada	2	
South-America	5	5 %
Brazil	4	
Argentina	1	

About 15–20 % of the European architectural schools (in total number about 200 schools), have actively participated in the eCAADe-conferences during the last decade (Figure 3). Almost 40 % of the European architectural schools have never been represented in these ICT centred forums, and additionaly, some 25% of the schools have participated just once (Figure 4).

Either the existence of the eCAADe contact forum has not reached all the schools, or the conference contents have not been interesting enough to more schools. Perhaps some kind of actions are needed, to stimultae activity in these less ICT-motivated schools.

number of schools

European schools represented in the eCAADe-forums
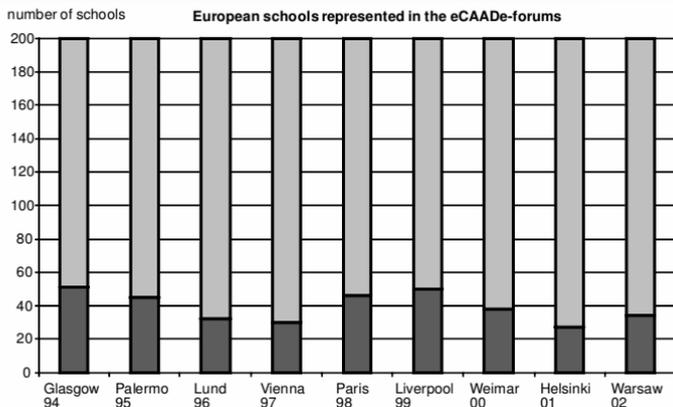
◄ Figure 3: Schools represented in eCAADe-conferences.

◄ Figure 4: Percentage share of schools participating in eCAADe-conferences.

never attended eCAADe-conferences

attended eCAADe once

attended eCAADe twice

attended eCAADe in all 9 conferences

0 % 20 % 40 % 60 % 80 % 100 %

percentage of all european architecture schools

Analysis of the web-survey started in the summer 2002, reveals that over 90 % of the European schools do have a website, but just some 25% of them seem to use it to deliver course content, and other educational facts in a substantial way. It seems that European schools' web-sites often exist,

because it is regarded as normal practice to have one, and not so much because of a real need to deliver facts and information.
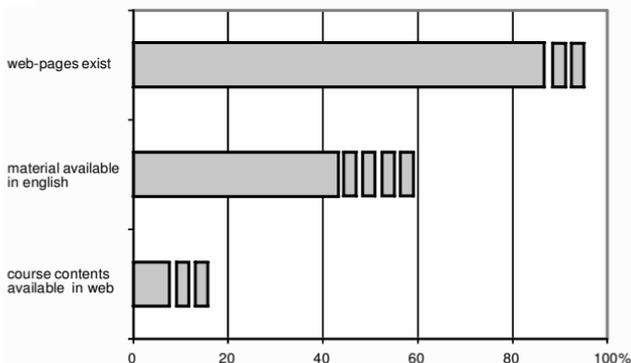
5. Hardware and software platforms

The data for the hardware and software statistics is collected from the active eCAADe-participants, which constitute 33 schools (i.e. about 16% of the European schools). Hence, it is likely to describe a too flattering image of the situation in general. The questionnaire data has been collected by the eCAADe secretariat at the Helsinki 2001 and Warsaw 2002 conferences, and the survey is planned to be a on-going activity.
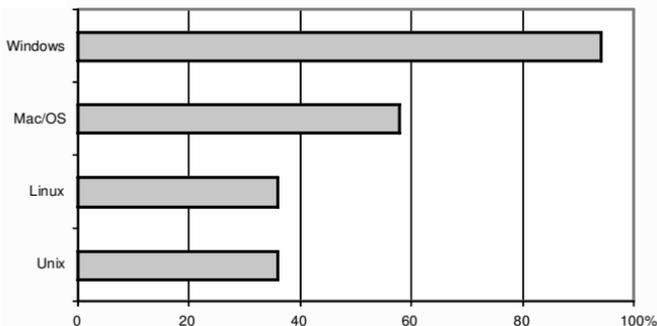
   It is important to note, that in these questionnaires, the schools have indicated that they simply do have the hardware or software. They usually have not indicated the number of workstations or software licences. In the

questionnaire, both institutional and personal software use questions were asked, but only institutional use is evaluated here.

The most common hardware platform in the European architecture schools is unsurprisingly PC/Windows (90-95%). Linux and Unix are also used commonly in servers (25-35%). Macintoshes (Macs) are also widely used in Universities and, it would seem, especially within the architectural schools (50-55%). This is a marked difference with Mac's share of the total in world's hardware platforms of about 5-10%. Dual-platform environments are common in the European architecture schools, since all of those schools that have Macs, also have PCs.

The most common software environment worldwide, MS/Office (90-95%) and PhotoShop (85-90%) are naturally also used widely in the architectural schools. The most common lay-out program in the schools is PageMaker (60%). QuarkXpress (35%) is also common. Half of the schools seem to use Dreamweawer (50%) in web-publishing. PageMill is the next most poular (20%). Illustrator (60%) and its competitor in the market, Freehand (25-30%) are the most popular graphic tools in the schools.
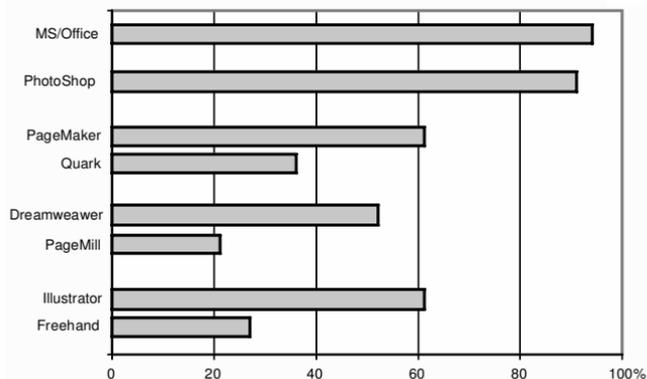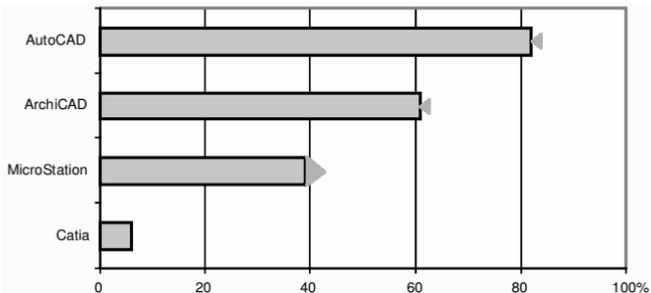

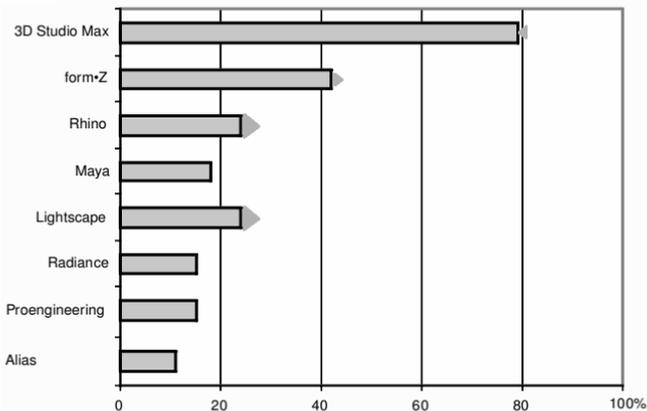◄ Figure 7: European architecture schools' general software used.

Of architectural CAD platforms, AutoCAD is, as in the industrial sector, the market leader (80-90%), followed by ArchiCAD (50-55%) which has a stronger presence in the schools than in European practice. MicroStation has also a significant presence (35-40%). Based on the two surveys (Helsinki 2001 and Warsaw 2002), both AutoCAD and ArchiCAD might be slightly declining in popularity, whereas Microstation is slightly increasing.

AutoDesk's 3DStudio is the most frequently found 3D modelling and rendering tool with 80-85% use, followed by FormZ (35-40%). Rhino and Lightscape have a growing share (15-25%), and Maya, Radiance, ProEngineer, and Alias have a somewhat smaller volume share (10-20%).
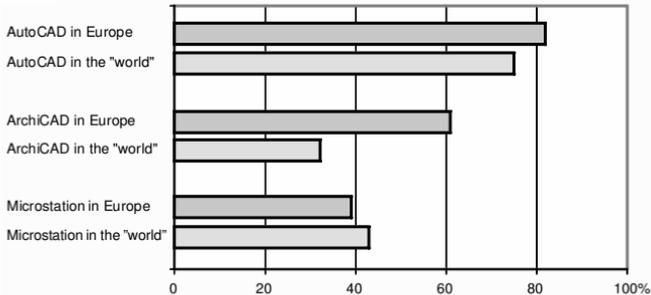
► Figure 8: European architecture schools' CAD-software used.

► Figure 9: European architecture schools' modelling software used.

► Figure 10: Software use in European architecture schools compared to those outside Europe.

When the status in Europe is compared with 28 returned questionnaires from outside of Europe, one phenomenon tha becomes apparent is that ArchiCAD is a European software platform. This contrasts with 3D-Modelling and visualisation tools which are used in approximately the same proportions in Europe as outside.

6. Conclusions

CAD and digital media have been adopted by the majority of the European architectural schools, as was noted by QaQish & Hanna [4]. This study of new media use and the volume of architectural IT and CAAD use may be somewhat distorted by the fact that the data has been collected from schools that, typically, are active in one or more of the international CAAD forums. The data presented here was collected at the eCAADe forum.

The eCAADe community perhaps represents a group where one would expect to find a high degree of 'visible' CAAD use, and, potentially, it gives good benchmarks of new media use to those schools, that are not so well equipped or skilled with the digital tools.

With consideration to the broader aspects of architectural-IT, the motivation to learn CAD and information technology and to integrate it within the architectural curriculum seems to have always been high among the architectural schools [5]. The IT-teaching environment in the architectural schools and the reception of new media information has generally been very positive, and studies of this kind are intended to support and inform activity in this area.

References

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5. Glennie, W.L., Europe '94 – A Visitor's Report on the State of CAAD in Education, in: Maver, T., ed., *The Virtual Studio – Proceedings of the 12th European Conference on Education in Computer Aided Architectural Design*, Glasgow, 1994, 262.

Notes

This research work is part of the author's research work at HUT, Department of Architecture, Finland entitled: Architectural Education and Information Technology, The Educational Meaning of Digital Media – A European Overview. The work was started in 05/2002 and it aims to

establish continuous activity on information activity between the architectural schools by maintaining the information with web-based tools. The work has been documented in the web at: www.arkit.net

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