

Student of Architecture – a Computer Slave? Attitude to CAAD among Architecture Students

Agnieszka Katarzyna Sowa

Białystok University of Technology, Faculty of Architecture

Abstract. This paper contains the results of some observations on how students use computers during their design work. The other reflections relate to problems with teaching how to use CAAD as not one and only right way of project presentations, but one of the available, freely connected with other, more traditional ones. Observations and conclusions drawn from conversations with students are extended and verified by a survey carried out at Białystok University of Technology and Warsaw University of Technology. Generally, it turned out that students used computers more and more willingly in their design work and in the preparation of presentations, which was predictable. Moreover, it seems increasingly more difficult to encourage them to use traditional media during design process.

Keywords. CAAD teaching; traditional media; digital media; students.

Problems and goals

This paper contains some observations made during a CAAD course, in which students had to learn how to use the computer to design and prepare the final presentation of an architectural project. One of the aims of the course was to encourage students to use both digital and traditional media during exercises. Hence, conclusions which were drawn induce to consider the relation between these two ways of designing and visualizing in modern architecture.

There are two basic aims of visualizations in architect's work. The first is communication with others (co-workers, investors); the other is simply design which can be "communication with oneself" by free-hand sketches, simplified models etc. Communication with others can also proceed in two ways, related to different design stages. At the beginning and in the middle of work on a project, the biggest number of drawings is created as free-hand sketches, as illustrations of particular discussed problems or ideas. In the final stage the perfect visualization of the finished project can be

made. So when we look at the capabilities of both modern computers and software, we may realize that digital media are not always the most useful and convenient in every stage of the design process. Architecture students should be aware of this and therefore ought to practice all possible ways of design visualization. Moreover, they should feel sure of their visualizing abilities. According to researchers from Texas A&M University (Angula et al, 2001) it is traditional media training which gives architecture students confidence and makes design more enjoyable for them. Additionally, knowledge of the drawing rules helps students to prepare visualizations which are correct from the descriptive geometry point of view.

On the other hand, there is a growing tendency to teach first year students CAAD at the very beginning of the curriculum, because even if they have good imagination and interesting ideas, their poor drawing abilities hinder easy visualization of projects. Moreover, there is a growing number of students that lack the necessary free-hand drawing abilities. Some of them simply have "clumsy

hands", maybe because of little opportunities in their childhood to draw or build physical objects (Morozumi, 1998; Hudson, 2000). It seems intriguing, as a relatively new and probably still not proven and examined tendency. It is also a new challenge for teachers. In 1996 it was true and obvious that for example "a big advantage for the use of traditional media is the fact that they are almost naturally learned during childhood" (Stellingwerff, 1996). Is it still true nowadays?

The next point is connected with usage of the computer in the last stage of architects' work: preparing visualizations of the completed project. Ucelli and others (1999) proved in their research that computer-generated visualizations of a building give a relatively high level of consciousness of architectural idea among laypeople. The researchers did not compare the computer generated images with the visualizations made by using traditional media. Instead, they confronted the observers' perception of a real building and computer generated images of it. Even the hide-lined images seem to be enough to feel the idea of an exterior and interior of a building. So in the future there might be no need to work with traditional media.

As we can see, present research gives many clues for both ideas: that free-hand drawing abilities are important for architects and students, as well as that everything can be made by computers more easily and effectively. The question could be what architecture students' attitude to this problem is.

CAAD course

During CAAD course which was given at Bialystok University of Technology in 2002, 3th year students faced a task connected with using both traditional and digital media in architectural design. The observations made during the course seem to confirm growing tendency of students'

dependence on computers. It does not seem to be a disadvantage at the CAAD course, but the goal of this particular one was to encourage students to use digital media combined with traditional ones.

Students' task was to prepare a 3D model in AutoCAD using plans created by them during previous semester (2D AutoCAD course) as a basis for further work. At the beginning of the semester students were asked to draw some free-hand sketches of a future form without the use of computers. This should have helped them to imagine and design a form and consider engineering problems as well. Many of such problems occurred, mostly connected with the ways and methods how buildings are put together, but it was also a challenge to most of the students to sketch properly. They had to be reminded all the time that not only axonometric drawings from aerial point of view should be prepared. Students should be aware that the best way to show the project to non-professionals is to prepare a perspective drawing where the sightline is at the level of the observer's eyes (Mullins et al, 2002). The computer gives its user the possibility to create unlimited number of perspective and axonometric drawings from any point of view. The architect's task is to choose the best and most appropriate one. Moreover, the chosen view should show the future form of a building in a way which will not beautify it and not mislead the observer. If the students do not even sketch their perspectives from a proper point of view, the possibility that they choose appropriate one for computer generated visualizations is not so strong.

After modeling the form in AutoCAD, the next task was to change the digital to analog again – to print hide-lined or shaded visualizations of a digital model as an "underground" for further work. If the mind is analog (Asanowicz, 2002), it is like the return to the beginning of design process which starts in a designer's imagination. The digital

Figure 1. Selected finding of the survey, showing students' attitude to using the computer in their school work (note: the sum of percentages exceeds 100 because most students have chosen more than one answer)

work, whose effects will be presented in analog way, might be considered as one of the most difficult. Prints seem to look not as interesting as visualizations on the screen, colors are almost always different. So perhaps the students should try to improve their skills and imagination in using CAAD modeling effects for further work with traditional media because "(...) drawback of the exclusive use of the computer is that the results are often perceived as being too perfect: too »clean«, lacking individual expression and the charm of a handmade artifact." (Breen et al, 2002). Or maybe we should forget about this problem, as a part of the CAAD history, disappearing slowly together with the appearance of more and more powerful computers as well as new software capabilities.

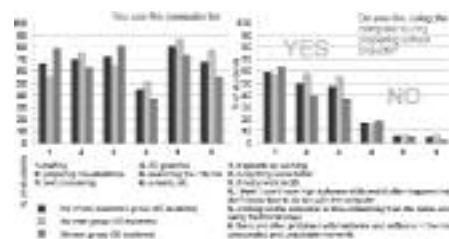
As for students themselves, they preferred not to change the final prints with traditional media, or change them as little as possible. They didn't even try to sketch human silhouettes or plants on visualization or add more light and shade effects, even when the prints looked sad and empty. It seems that they always considered their own free-hand additions as "ugly" or "unskillful". Maybe, if the students had been shown good examples of collages etc., where computer models are used as "underground" or mixed presentation- techniques both digital and analog, they would have known that there were many possibilities to explore. But today they think only about using CAAD. Moreover, as it was mentioned, maybe it is one and only correct tendency in today architectural design.

Survey

More questions about how and why students use computer willingly are asked in the survey which was conducted among students at Białystok University of Technology as well as at Warsaw University of Technology.

Most of the students have filled in paper questionnaires, but there was also possibility to answer the questions via the Internet (English translation of the questionnaire and detailed results are available here: <http://ankieta.scene.pl/en>). Questions, which were answered by 83 students (38 participants of the CAAD course mentioned above and 45 first year students), related to two topics:

- usage of the computer by students during their school work on projects;
- students' awareness of what methods of architecture design presentation they prefer in their work and when they judge others' projects;



To examine students' awareness of their own visualization preferences, two questions were asked. The first encouraged students to specify what CAAD is for them in their everyday design work. Most of the students (42 out of 83 students) start designing with a piece of paper and a pencil, by preparing free-hand sketches. The ideas are then transferred to computer, processed, printed, resketched again, etc. The rest claim that they either design everything using traditional media and the computer helps them only during preparing the presentations (21 out of 83) or they create digital 3D models and need no free-hand sketches before (20 out of 83).

The next question asked refers to students' preferences when they judge project presentations. Generally, the same number of students

prefers presentations of a project created with the computer as the ones where physical models were used. Drawings created with traditional media are preferred by about one quarter of the examined students. When the matter is “showing the future form of a building in a more objective and better way”, the pros of digital and physical models are almost the same, only fewer students prefer drawings with traditional media.

Conclusions / questions to be answered

The survey was carried out with a relatively small group of students; therefore the findings cannot be stated as fully proved. But one can try to draw some general conclusions. Today architecture students seem to be aware of design possibilities provided by computers and software. They use digital modeling and drafting programs willingly and frequently. Moreover, the younger students are, the more they use computers in every stage of design process. This tendency might be connected with the growing lack of students' abilities in drawing and making physical models, but it can be as well an effect of the computers presence on almost every student's desk. Computers become indispensable and essential help in everything, often also the source of the beauty of presentation.

What seems hopeful in this context, even if students are not good at making the physical models, they recognize them as one of the best way of presenting architectural design effects and appreciate them more than traditional media drawings when the matter is the objectivity of the presentation.

It might be a good idea to carry out a similar survey on a bigger group of students. It could be interesting to know what a students' attitude to CAAD depends on. The other important issue is to verify the hypothesis that new generations of students really have poorer drawings abilities than their predecessors.

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