Thinking of using computers in architecture, we have probably already learnt that there is much more than just one general way of doing so. At the same time, the general description of the field - i.e. the 'title' Computer Aided Architectural Design' has become a rhetorical figure - actually it covers much more activities than those just aiding design.

To some extent computers change architecture introducing new values into it. This does not mean that they change architecture at all, but these new values begin to exist pararelly to the already present and accepted ones. In such sense architecture is changed - one of the possible branches of development is the one related to computers (no matter how complex this branch itself is).

Architecture is in a constant change - and it is a cultural condition. There is some confusion nowadays when interpreting the state of architecture. Can it be suited to the general situation of the modern (post-modern) culture? Some state that can't. Peter Eisenman wrote in 1992 that during the 50 years after II world war we had faced a paradigm shift - a shift which should have influenced architecture. The paradigm changed from mechanical into electronic one. According to Eisenman architecture did not changed as much as other spheres of culture, so it is not a relevant participant of the current times. From the point of view of CAAD - I think that in most cases we can agree with Eisenman's opinion. When we use computer as a drafting and data storing device, we still work in an old manner. If we look for a creative relevance of computers in architecture, we have to say that they can change architecture only when they are used in ways which are different from the use of traditional tools and media of architectural design. New way which is different, but conscious and productive. Of course it is people who constitute changes, not machines. However, the new environment inspires (can inspire) new thinking - and this perspective of computing should be opened via, for example, architectural education.

Architecture really influenced by computers can be one of the adequate ways of 'suiting' architecture into the specific of the present and future times.

But now we can try to name the changes which actually go on in the sphere of junction - where architecture meets computing and vice versa. There are some spheres where some basic, but essential changes have already happened or differences which are just characteristin comparing the old and new environments of design.
1. Transformation of the tool.

Traditional tools - paper, pencil, table, etc. - can be described as set of authonomous, single-task devices, which gathered together, can create an environment of designer's work.

Computer - is a system of linked, fully interdependent elements, which in sum create one device (from the technical and 'material' point of view). It is one tool with a changeable profile. In a specific linkage with a user, enabling him to communicate - it is a complex unity, authonomous, multitask system, itself is an environment.

2. Transformation of the medium.

According to McLuhan, the medium is the message. When the medium changes, the message does as well. In architectural design, transmission is based on a direct and physical notations (records) of the subsequent stages of design. They are the direct result of the design activity. Notation is equivalent to transmission.

Notation transmitter

Author ⇒ ↑↓ ⇒ Notation ⇒ Transmission

Notation carrier

Computer, at the present stage of its development, seems to be an ‘intermediate element’, which transforms traditional notation, putting it into a completely different, electronic environment. This is a different kind of record - basically it is an indirect notation. Notation is not equivalent to transmission.

Processing
(signal transformation)

Author ⇒ ‘signal’ ⇒ ↑↓ ⇒ Notation transmitter ⇒ Carrier ⇒ Transmission

Notation

This ‘indirectness’ of computer is either a cultural condition (difficulty, resulting from the need to learn how to use it, which shall disappear, when computers become as normal and common devices as TV sets) or the technical one, with the inborn unavoidable characteristic of digitalisation of the input data (for the non-informatician it just means
that data which is inside the computer box is not the same as what is on
the screen).

3. Transformation of perception, imagination and thinking.

This point concerns mainly those who are more or less familiar with
computers, because it says of the computer influences on the user. The
tool always has an influence on the methodology of the work done with
the use of that tool. So we can’t deny the influence resulting from the use
of computer - and thinking of architecture it is not only a negative and
destructing influence. I am going to illustrate it with just one example -
resulting from my own experiments with 3-dimensional modelling.
Peter Eisenman stated in the already mentioned text, that perception of
architecture nowadays was still based on the linear perspective
principles, and planimetric system of presentation, which had been
discovered in XV century. This tradition is still untouched, Eisensman
says, as it enables projection at all - as a way to represent 3-dimensional
space on 2-dimensional plane. We can now say that computer based 3-
dimesional modelling enables us to overcome this limitation (under the
condition that we agree with Eisenman that it is limitation) - almost every
modelling software package makes it possible to choose the way we can
look at the model - we can see plane views, axonometric views,
perspectives, and they all can be placed on the same screen at the same
time. This is just one aspect, resulting from the objective possibilities of
the software. On the other hand, on the computer screen, we can see the
object in a new way, using for example undesirable, intermediate phases,
views of designing - modelling - vector based views, where all lines,
objects are seen at the same time, when they overlap, when the spatial
orientation can be questioned, when we freely change the parameters of
viewing. This can be a source of completely new perception and new
visual consciousness of the designer, because he can reach new visual
experience, following (not blindly, of course) the way computer displays
the object. This is not fully suitable of course to the projects which are
created according to the traditional methodology and traditional
perception of architecture and its project, however can inspire. This is
rather to search for architecture of the unexpected, new space, which
cannot probably be conceived without the new medium, the computer is.
The main problem here is to evaluate the achieved results.
Computer based modelling at the same time gives the enormous
opportunities to easily create and analyse the structure of the architectural
object - either from simulative or creative point of view.

4. Transformation of communication and collaboration.

This sphere is probably the most dynamically developing sphere of
computing nowadays at all, and the most revolutionary contribution of
computers into the culture of contemporary civilisation. The whole
sphere of computer networking changes the way we communicate -
making communication easier, more accessible, but it also changes
deeply its participants. The consciousness of Cyberspace, which is present and invisible, changes the way we seen the world, as ‘the cybernet, the sum of the all interactive computer-mediated systems and telematic networks in the world, is part of our sensory apparatus’ (Ascott, 1995).

There are many projects going on, which try to examine the networked designing nowadays. And it seems to be exciting to collaborate with the design teams located on the other side of the globe, working together, staying in your own room. This is also the process of the great cultural importance, as the local cultural differences can influence us more easily. From the technical point of view, computer networking, makes it possible to eliminate some intermediate stages of design process (see, for example Novitsky, B., J., ‘Gehry Forges New Computer Link’, Architecture, 8/92), reduce the time of the information exchange and support the decision making.

5. Transformation of methodologies.

The most important thing in this sphere is the possibility to change the order, the traditional hierarchy of the design stages. Computers can help us even reverse the design process - or rather to ‘play’ with the stages, making the process more simultaneous, according to which aspect of the project we consider primary (at the given moment) - form, function, structure. Again - the aim is not to replace traditional design environment with computers, but creatively use it as an additional, one more design medium. In the design teams, different aspects can be developed with the use of different media - according to the designer’s preferences and needs.

6. Transformation of architecture.

There are two main levels of searching for the new in architecture (in the context of computing):
- new influences, new formal, structural, functional, etc. inspirations, ‘proposed’ by computer space, which can be realised in traditional way;
- search for a completely new carrier of architecture, resulting directly from the development of electronic media and technology;

The media of architecture are changing i.e. new ones are introduced. New media give new kind of message, or at least new form of message - and this inevitably changes the contents.

New electronic media change architecture very dramatically, though unconsciously.
It is an unconsciousness of users, architects using computers and teachers teaching computing in schools of architecture. Unconsciousness of the new message.

220
Architecture is being changed by machines: electronic media - they change modes of thinking of their users.

Architecture can be changed by users by means of these machines, where individual mode of thinking uses and transforms machine’s features to produce and introduce new, different values to architecture.

New media of architecture here is understood not rhetorically, but as the environment to construct architecture, neither to simulate nor represent it, where traditional components of architecture are replaced by clearly electronic transmissions, messages, which would shape the space in a new manner, where the only interface is electronic, but real architecture itself. (Jakimowicz, Kadysz, 1995).

Maybe it is futurology, but surely the tools and media deeply influence the final product. Therefore new, electronic forms of architecture will appear - first as ideas, later as new kind of architecture, electronic architecture, where the space is shaped not by material means, but by electronic transmissions.

‘Architecture will continue to stand up, to deal with gravity to have ‘four walls’. But these four walls no longer need to be expressive of the mechanical paradigm. Rather they could deal with the possibility of these other discourses, the other affective senses of sound, touch and of that light lying within the darkness’ (Eisenman, 1992).

References