

Teaching machines. A creative revival of architectural education or a pernicious restoration of technical dominance ?

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1. Introduction

Architectural design is not a science nor a technology. Architectural design is a praxis of both. It embodies knowledge coming from a large range of varied domains, like policy, culture, economy, environmental science, psychology, ..., but it must be clearly distinguished from each. It has little to do with the knowledge development or with a better understanding of physical phenomena.

Architectural design is a creative activity generating products that intend to achieve:

- the fulfillment of individual and social needs
- serve certain purposes;
- in order to change the world.

It is a purposeful activity intervening directly on the built environment in order to intentionally modify it. Therefore, teaching architectural design can reasonably be organized as a training for action and, by contrast, the knowledge attainment becomes a relatively secondary objective.

2. The Studio-Pedagogy

The traditional way of teaching students in architecture is mainly based on an organized and simplified simulation of the design practice. It consists in the production of architectural projects in a strongly controlled context called the Studio.

This context is supposed to be an appropriate representation of the design situation occurring in the professional practice. In order to make the model more realistic, a senior architect has in charge the responsibility of defining the design problem and evaluating the proposed solutions. He assists also the students in suggesting ideas for the solution or setting up architectural models for reference.

This way of learning is often hold responsible for the pre-scientific status of architecture. We are forced to recognize that its imitative structure has probably refrain from producing an objective knowledge allowing a transfer in an independent way. But, on the other hand, the Studio teaching practice is rightly considered as well adapted to the development of the creative potential of the taught person for many different reasons from which the two following ones are taken here:

- The student is placed in a discovery situation within which he has to act and this is highly propitious for moving him to enthusiasm.
- He is free to choose his own way of proceeding and than is able to build his personal mental structures.

Nevertheless, this procedure has been criticized for long time mainly as being more adapted to reproduce the professional production made than to really train the young architect for action.

The problem is that the presence of the senior architect in the Studio is a too simplistic way of representing the real world. This unique reference against which the learning architect is forced to test his design ideas can be the occasion of biased perceptions of the design situation because it maintains in any circumstances an interpretative "layer" between the person trained for action and the place where he is supposed to perform his future action (client, environment, building process, ...). What is more, it is a very slow process of learning.

3. The new learning situation

Using the computer for architectural design is a kind of silent revolution, a progressive but non-reversible transformation of all the methods, techniques and matters involved in the professional practice.

Of course, architectural education cannot be kept out of this movement. It will be forced to take into account the induced modification of the knowledge and the know-how. Even if the computer becomes more and more user-friendly, a special training in new computer technology is needed in order to reach an acceptable standard of efficiency and behaviour. Architectural education is directly questioned by these new requirements from the practice and is certainly aware of the necessary introduction of this new training in the curriculum.

But the computer can, also, be used as a tool for teaching a large range of matters not necessarily linked with computer science. The impact of the computer as a teaching tool can be very important, specially in the architectural field, according to its specific capacities in transferring a meaning.

In order to clarify the point, a typology of computer aided learning tools will be presented. Four types will be kept for further examination:

- Questionnaires.
- Learning games.
- Simulations.
- Utility tools.

An example of simulation will be demonstrated with the package "STRATEGY" This computer programme is used in the architectural curriculum in order to teach the students in energy conscious design. It places the learned people in a fastly reacting context enabling him to test different solutions in real time and to visualize the effects of its decisions.

A second example relevant to the class of utility tools will be showed. This programme hasn't been specially developed for education, but it is regularly used in this context with great success according the user interfaces it has been provided with. This second programme is a CAD system with a large range of evaluation modules allowing the student to develop his designs in a reliable scientific and technical context.

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