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Computer Supported Design Studio

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Abstract

The paper presents the ongoing experimentation of a Computer Supported Design Studio (CSDS). CSDS is part of our continuing effort to integrate computers and networks in the design studio. We recognise three corner stones to CSDS: memory, process and collaboration. They offer a framework for the interpretation of the pedagogical aspects of the teaching of architectural design in relation to the innovations produced by information and communication technologies. The theme of the 1998 CSDS is a railway station in Turin, Italy, to be incorporated in a reorganised rail transport system. The choice of this theme emphasises the realistic simulation aspects of the studio, where technical problems need to be interpreted from an architectural point of view.

Keywords: Design studio; Design education; Digital design; Teaching architectural design; Information management; Collaborative design

1. Introduction

From our point of view the effort to integrate computers and networks in the design studio is part of a broader aim: evolving the way the studios function, which ultimately relates to the pedagogy of architectural design. Of course, strictly speaking, this is as ''pertinent'' to computers as writing a book is to a word processor.

Students, practitioners and academics require deliver new skills in digital design media. Moreover students, practitioners and, sometimes, academics require to rethink the teaching of architectural design with an awareness of new capabilities opened up by digital technologies.

This paper presents the ongoing experimentation of a Computer Supported Design Studio (CSDS) between the Dipartimento di Architettura e Urbanistica per l'Ingegneria, Università degli Studi ''La Sapienza'' in Rome and Dipartimento di Progettazione architettonica, Politecnico di Torino in Turin, Italy.

2. What does Computer Supported Design Studio do?

Until now, the only way design could be taught was, either by allowing students to participate in a design project, or by having them develop the design. The first of the methods is apprenticeship; the second is that used by schools of architecture. It may perhaps be possible to introduce the first method in the Schools, but this would run counter to a 200-year

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tradition, originating with the 18th century Academies. The pattern of the studio education can be defined in design exercise as simulation, educator role, graphic formulation, continuous teacher–student interaction [1,2].

- A design studio is a simulation: that is, it implies imagining a virtual transformation of an area, in the city, country or wherever, and is relatively free from any need to actually realise the project.
- The teachers' role is to reproduce real project conditions, to provide a method of working which will cover everything the students need to work on and learn during the design. Throughout the ''guided design'' she or he must help students to follow all the stages of a significant experience of design. ''The studio instructor will be their semester-long guide into mysteries of design. (...) In studio, students gather the individual instructor's method and Weltanshauung'' [1].
- The design exercise is formulated graphically by means of documents, e.g., sketches, drawings, drafts or models.
- A key element of the studio method is continuous teacher–student interaction, direct communication between the teacher and the individual student or, at the most, a small group of students.

Since Academies, several institutions — Bauhaus, Hochschule für Gestaltung Ulm — have reinterpreted and innovated the design studio tradition to face emerging pedagogical or design issues.

The goal of CSDS is finalising innovation in information technology to support a pedagogical methodology, which prepares for multidisciplinary approach, ''best practices'' from industry, hands-on experience in digital media, teamwork and concurrent design.

- ''In architecture, as in other professions today, the debate continues over the issues of specialisation and generalist training.'' [1]. CSDS approach is to challenge students in realistic design simulation, where they are requested to creative synthesising at the intersection of several disciplines. While in the traditional studio punctual interaction with experts from several knowledge domains proves difficult; the Internet can support continuous access and interaction with experts of different disciplines.
- Internet links can be institutionalised or ad-hoc set to involve professors in various disciplines as well specialists from industry or practicians. This is an effective way to integrate ''best practices'' from industry in the studio.
- Computer-based collaboration exposes students to hands-on experience in solving technical problems by means of teamwork. Students are challenged in digital media application in order to collaborate successfully. They acquire team design experience based on concurrent application of multiple disciplines through the design process.

The Computer Supported Design Studio has three main key elements: memory, process and collaboration.

2.1. Memory

Memory consists of the documents elaborated during the design studio: from its early stages to the final presentation. A good final design is not the whole pedagogical aim of the design studio: it's equally important to teach a methodology. This methodology is the outcome of continuous revision and suggestion focused on the student's design exercises. Schon's theories [3,4] evidence the relationships between the dialectical nature of design and the design media, the ''materials'', i.e., sketches, drawings. The memory collects over time the dialectical, graphical, formulation of design exercises.

During the studio the student develops several design solutions, some are discarded, others are developed further. The memory embodies these design solutions — sketches, drawings, models, notes, etc. — together with revisions, comments and redlines from the instructors.

Classification is a fundamental capacity of memory. Classification is necessary to retrieve a student's work from the huge quantity of documents created during the studio. Moreover, classification is necessary to extract semantic information on the progress of the studio as a whole, of students' work and of relationships between the design exercises. Much remains to be done towards the formalisation of knowledge in the memory (knowledge bases, object oriented, distributed inference engines), the coherence and structuring of the information (e.g., ISO10303-STEP, IFC), the polymorphicity on networks of the objects and the constraints and the operators involved [5].