

Situated Learning in the Design Classroom – Can Computers Facilitate the Teaching of Design Computation?

This thesis will focus on the theme of situated learning and visual communication within design development and pedagogy. It will consider the role of computers in design teaching and collaboration. Currently, much work is being done with developing and extending tools for design practice – however, it is my intention to step back and consider the teaching/learning aspects of design. How can computers be used to encourage proactive learning? Shape grammar, as a relatively new area of design research, is an appropriate vehicle for the development and application of my research – largely due to the need for better tools to explore the complexities inherent to this design approach.

It is important to contextualize the collaborative environment for the purposes of this research, and to understand the history of both computational design and collaborative design methodology in the teaching process. It will be pertinent to take a critical look at past and current collaborative methodologies, and at how new collaborative tools might combine to influence and facilitate the design education process. Can existing tools be used in non-traditional ways? Are current programs (software) conducive to a productive working environment?

There are opportunities available to exploit the Internet to encourage and improve remote learning, teaching, and collaboration. Although the Internet is used widely for the distribution and dissemination of knowledge, this thesis will look at the possibility for it to be also used for developing knowledge interactively, in a design education context.

One of the research threads will be to reflect on previous approaches, taking various projects and environments into consideration, and consider what positive features (if any) were apparent in the collaboration process. What can people bring to each other? What are the benefits of collaboration as opposed to working individually? What are the limitations of current technology? What are the differences between digital media and its analog equivalent – can digital media facilitate different modes of thought? Is technology being fully exploited? How can architects influence the tools being made available for their use?

I have developed a computer program for the purposes of exploring the notion of situated learning in the design studio. Shaper2D is a program written in the Java programming language. This prototype program explores the notion of using computers as an aid to teaching shape grammars. It was developed with the goal to create an intuitive user interface that encourages the student to experiment with the design concept being taught.

In order to assess the program, and to develop a critique of its use in a learning situation, Shaper2D will be used as part of a collaborative workshop to be held between MIT and the University of Miyagi in Japan, in February 2001.

I will pose various questions as part of my investigation, including:

- To what extent is the design computation tool Shaper2D helping students to learn, in comparison with work done by hand?
- How do students with no computing skills learn/design with the tool compared with those that do?
- Does the program provide a better concept of the design process when designing something using the rules imposed by shape grammar?
- Can the program be used without understanding the shape grammar aspect of it? Is it possible for students to achieve results without knowing what they're doing?

It is proposed that future work on the program could integrate a truly collaborative platform for students to explore new ideas in shape grammars, and will further integrate the design learning and design practice aspects of its use. However, for the purposes of my current research interests, emphasis will be given to the use of Shaper2D in a purely didactic context.

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