Chapter 4
Pedagogy and Curriculum in Architecture and Engineering

ABSTRACT

There are two controversies besetting design education at the present time. The first controversy is the question of whether the goal of design education should be the development of individual talent or the development of cultural and ethical sensitivity. The second controversy is whether the methodology of design education should consist of the transmission of knowledge or the construction of knowledge. Indeed, constructivism, based firmly on the pragmatic philosophy of John Dewey, has recently become the standard paradigm for the delivery of education to architects. The "reflective learning" model of Donald Schön (1984, 1988) and the "experiential learning" model of David Kolb (1983) are exemplary, though both have had their critics. The principal criticism is that these constructivist theories are not academically robust, because they depend too much on tacit and evolving knowledge. Nigel Cross (2001) suggests that there is "a designerly way of knowing," but he has not defined such an epistemology, though it might be found, as it was suggested in Chapter 3, in Frascari's argument for Vico's "universal images" as the language of design. It is possible, too, that positivism might be replaced by complexity theory in design education. Complexity theory has the advantage of relying strongly on autopoiesis as an integral part of the design process, thus making uncertainty more acceptable to academic accounts. The trouble with complexity theory, however, is that it eliminates individual imagination from the creative process, and neither architects nor engineers are prepared to make such a concession.

INTRODUCTION

So far we have seen that the process of design is what connects the education and practice of architects with the education and practice of engineers. Moreover, we have seen that design is

done through technology – increasingly through information and communication technology (ICT) – and we have noted that engineers appear to be more comfortable with technology than architects, apparently because engineers are mainly technical in their occupation, while architects tend to

be both artistic and technical in their occupation, and this sometimes causes problems. Nevertheless, in academia both architects and engineers are regarded as design professionals, and the matter of their education is usually approached in a similar manner. In this chapter we will investigate pedagogical theory and curriculum development in relation to architectural and engineering education.

At the present time both pedagogical theory and curriculum must be responsive to the ever-increasing social, economic, and ideological pressures of globalization. The postmodern curriculum is a strongly contested text or form of discourse, claimed by social reformers on one side and champions of personal student development on the other side. This contest pits humanistic values and meanings against scientific and technological learning. At the same time, sustainability ethics is contrasted with phenomenological epistemology. In other words, social motives are contrasted with subjective motives. To complicate the matter, the opposing sides sometimes appear to come together. One may, for example, be a committed "green" architect and still believe in studio-based tutorial education for architectural students.

Nevertheless, the tension between social responsibility and individual development represents more than a clash of pedagogical approaches. It forms a parameter that serves to clarify and explain the kinds of choices and possible compromises that must be made today by those who attempt to create a theoretically sound and workable curriculum for the education of architects and engineers. In this chapter we shall explore the historical development of this parameter of curriculum, and then investigate how its variations help to illuminate important issues faced by architectural and engineering educators at the present time. In particular, we shall examine the currently accepted claim that the paradigm of constructivist learning is the optimal pedagogical framework for the education of architects and engineers.

To do this we shall examine the Experiential Learning theory of David Kolb and the Reflective Learning theory of Donald Schön. We shall also look at critics of the constructivist paradigm, such as John Sweller and David Merrill. We shall then ponder the question of what should be taught to design students in architecture and education. Is there a body of knowledge – an overarching theory or model or paradigm – that should be impressed upon students in the course of design education? If design educators wish to maintain a legitimate claim to intellectual rigor, they should be able to identify this body of knowledge and work to instill it in their students. As we shall see, however, such a desired pedagogical state has often proved to be problematic. After this, we shall examine the possibility that complexity theory might also be used as an alternative paradigm to the standard positivist paradigm of design education. Finally, we shall look at how ICTs are now being considered for the creation of Virtual Learning Environments (VLEs) for design education.

DISCOURSES OF CURRICULUM

Few people would argue that at the present time the world is undergoing enormous social changes and these changes are having an inevitable impact upon educational theory and practice, particularly in regard to the curriculum. When all is said and done, despite the availability of a virtually infinite array of definitions – see, for example, Lane-Kelso (2001) – the curriculum is what is taught, how it is taught, and why it is taught. Kliebard (1988) offers a succinct outline of the history of the curriculum in Western societies, emphasizing that the long established literary and humanistic curriculum of the liberal arts was overthrown in the late nineteenth and early twentieth century by advocates of a purely scientific and even technological curriculum. Following Charles Darwin's (1859; 1871) publication of evolutionary theory, reformers such as Herbert Spencer (1891; 1911) insisted that only knowledge that led in a measurable way to the survival of the human

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