

Chapter 11

LEARNING AND TEACHING

Why you might find this chapter interesting

In this chapter, we take forward the idea (from Chapter 10) of designing as a pedagogic vehicle. We examine in particular the role of design portfolios from the points of view of both the learner and the teacher. Learners will typically see the portfolio as a product development device, whilst the teacher will additionally be looking in on it as evidence of learners' cognitive processes; their proposals, their communication approaches and their decision making. We recognise the need to respect the individuality of learners' approaches to designing and reassert the design-like nature of broader decision-making processes.

We conclude the chapter by analysing the pedagogic power of structuring in design processes. This is not about the task that drives the activity (see Chapter 10) but rather about the steps and sequences of the process through which the activity unfolds. We discuss the autonomy / constraint paradox that has been highlighted in a recent research project, and use it to identify the twin demands of any design challenge.

We described in Part One of this book our starting points for grappling with research, and these starting points were principally located in the territory of **learning** and **teaching** towards the goal of building learners' **capability**. In Chapter 15, we discussed the multitudinous descriptions of the activity of designing, and how we took a somewhat different view of that process. We also discussed the nature of design tasks that launch this process. In this chapter, we explore how these two take on particular characteristics when viewed through an educational lens. What does designing look like when the

principal purpose of the activity is not to produce an object, but to enhance a learner's capability?

The conceptual framework that we sketched out at the start of this book provides some parameters that give us a starting point. Activities should be based on authentic tasks, with real purposes and users, and they should engage learners with the iterative processes of imaging and modelling, moving progressively towards a resolution of the task. In this chapter, we explore the nature of the **learning** process in design, and how teachers can use the process quite deliberately for pedagogic purposes.

1. THE PURPOSES OF PORTFOLIOS

We have described in Chapter 10 how we see designing as a dynamic, iterative imaging and modelling process. The resulting portfolio potentially contains all the ideas and thoughts that were part of the evolution of the outcome, and together they tell the story of that evolution. The portfolio becomes an explicit representation of the thinking processes that were involved in the project. And – as a teacher – there are two completely different ways of looking at it.

By reference to the portfolio of drawings, calculations, models and notes left by Edison and Bell, Gorman and Carlson did much more than merely **describe** the development process of the telephone. Additionally, they were able to comment on the state of the science and technology on which Edison and Bell were drawing (what was and was not known at the time). And even more than that, they could comment on the points at which Edison and Bell branch out into new territory – experimenting with ideas that had never before existed; like the ‘speaking box’ that converted sound waves into a variable electrical current. More even than that, they could comment on what happened with the initiative – how successful it was – and what Edison and Bell deduced from the results of their experiments. Eventually, of course they could describe the final working telephone.

All this is discernible in the portfolio. From Edison and Bell's point of view, the portfolio was a working document that helped them to thrash out how to build a telephone. But this same portfolio becomes something very different when viewed from the standpoint of Gorman and Carlson. For them it is an illuminating lens that shines a light into the minds of the two designers – and into the state of the science and technology that they were using. Gorman and Carlson are not interested in the object – the telephone – they are interested in the process of innovation. The paper they published on the subject was not about how the telephone works. Rather it was entitled ‘Interpreting invention as a cognitive process’ (Gorman & Carlson, 1990)