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Review

Design Epistemology and Curriculum Planning

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This fascinating book sets out to explore design epistemology in the context of curriculum planning and is a response to the Expert Panel which considered the future of Design and Technology (D&T) in the English National Curriculum. Ever since Aristotle proposed his intellectual virtues of epistêmê, technê and phronêsis, the concept of epistemology in education has invoked substantial philosophical debate. Much discourse pertains to the validity of knowledge types such as 'knowing that' and 'knowing how' (Hetherington, 2011; Stanley & Williamson, 2001) with further debate focussing on the role of knowledge in education relative to what are often described as transferable or 21st century skills or competencies. Part 1, the introduction to this book, eloquently frames design epistemology as "what designers know and how they know it" (p.6) and although not yet well understood relative to other ways of knowing, positions designerly ways of knowing as a critical construct in contemporary education.

Part 2 of the book contains an editorial from a 2013 issue of *Design and Technology Education: An International Journal* (Norman, 2013) which builds on the introduction in helping to frame a conception of design epistemology. Although specifically addressing design curriculum planning in England, the discussion is applicable to design curricula in general as Norman mediates the positions commonly taken in terms of design knowledge. The first of these being that the knowledge inherent in design is unbounded as design problems are undefinable prior to designing and the second is that there is a fixed core of knowledge allowing designing to take place. Referencing work from the Assessment of Performance Unit (APU) and Vincenti (1990), Norman manages to describe how neither of these positions are wholly accurate as design problems vary in how well- or ill-defined they are. Yet although this description complicates the idea of design epistemology, you are left with a greater tacit understanding of what a designerly way of knowing could mean.

Part 3 comprises of a series of six short chapters, each by a different author, which provide commentary on different topics related to design epistemology in education. While each chapter delivers an important message independent of the others, they are all tangibly related and through their compilation the effectiveness and compulsion of their ideas is magnified. In the first of these chapters Atkinson (pp. 13-17) highlights the effect that the fluid nature of design epistemology discussed in Part 2 can have on its position and

perceived position in educational curricula. The Expert Panel considered D&T to have weaker epistemological roots and insufficient disciplinary coherence. Atkinson notes that while D&T is coherent in terms of its aim, it is less clear in its prescription of what should be taught and how it should be taught. She then progresses to describe the difficulty this can create for teachers in parallel to describing changes which have occurred in the provision of D&T both at post-primary level and in teacher education and culminates in how this can result in a negative spiralling effect in terms of the provision of D&T. This is followed up by a chapter discussing the thinking behind the Expert Panel when considering the importance of subjects for the English National Curriculum (Hardy, pp. 18-21). Hardy notes how the work of Hirsch (2006) and Willingham (2009), who focus on the value of knowledge and facts was lauded by the commissioners of the Expert Panels report. Unfortunately for D&T, where the boundary of knowledge is not clear, this resulted in its decline in the national curriculum.

Subsequently, Kierl (pp.22-27) navigates the reader back to discussion on the nature of design epistemology. While still acknowledging curriculum planning, Kierl comments on locating design knowledge. The chapter poses a thought-provoking, philosophical debate in which Kierl discusses orthodoxies of knowledge, subjects as knowledge disciplines, positivism, critical theory, knowledge interests and more to infer how a reframing of design epistemology could lead to an elevation of its richness and power as a field of learning. Newman (pp.28-31) maintains this discourse on design epistemology by discussing how designers know what they should know. A number of very important points are made. In the opening part of the chapter Newman describes how he can easily explain what he knows to other designers but to a non-design audience this is harder. The implication of this being that there is either a particular language to design, or that design knowledge is tacit and only through experience can it be innately understood. As the chapter progresses it is clear that Newman explicitly means the latter. Newman communicates some very fundamental messages about how design knowledge can be learned, but underneath his discussion is another facet of design which is a challenge to educational stakeholders – not only is design epistemology fluid, but many elements are tacit and some may only really be understood by other designers. Shepard (pp.32-38) talks specifically about design methodology. Similar to how design knowledge is a complex construct, Shepard discusses how this is the case with design methodology and the design process as well. While this chapter does give more concreteness to knowledge that is important for designers, its conclusion is significant in its portrayal of the broadness of design, that it does not and should not exist in isolation in the subject of D&T. The final chapter in Part 3 is offered by Spendlove (pp.39-42) who contributes a complex discussion on design thinking and presents the need for the D&T community to capitalise on the emergence of design thinking in education in the conceptualisation of a new “Design and Technology 2.0”. Similar to previous chapters, Spendlove reflects on the ambiguous nature of design epistemology, the English governments’ current educational position and the decline of D&T in post-primary education in England and in doing so his chapter has been perfectly placed to bookend much of the ideas and discussion from its predecessors. The vision of a Design and Technology 2.0 also offers a welcomed optimistic note through its provision of a collective agenda.

Part 4 contains two chapters both on visual thinking and graphicacy, the first by Baynes (pp.47-64) and the second by Danos (pp.64-84), which are preceded by a short introduction.

It is difficult to put a review of Baynes' chapter into words – trying to do so has become a somewhat meta experience. The reason for this is that Baynes' chapter consists predominantly of a delightful array of images. Created by Baynes himself, the images serve the purpose of illustrating how the human mind can make meaning out of visuals. The saying "a picture is worth 1000 words" is very appropriate for this chapter. The 12 images which are used reflect just how powerful graphics can be as a language or perhaps a metalanguage of design, a message which is made clearer and more efficiently through the use of the graphics themselves. Danos adds to this discussion by acknowledging the ubiquity of visuals in society and describing her own work which involved the creation of a taxonomy of graphicacy. Having established the educational and societal importance of graphicacy, Danos provides evidence of its natural development in children and of how it can be developed in education. Her synthesis of the human cognitive capacity to interpret visuals and the communicative power they can have with the societal and educational need to further acknowledge the development of graphicacy creates a strong narrative for its further consideration within D&T education.

Part 5 contains another contribution by Baynes (pp.85-92) in which he offers a wider perspective on design epistemology. The chapter offers an interesting perspective on design and in particular the value of design. An analogy involving a park is used to describe how design can offer a value which is difficult to quantify but that this characteristic does not mean it has no value. When reading this you are reminded of earlier discussions in the book and are forced to contemplate the question of how then do we prove the educational significance of design? In the conclusion, key aspects necessary to any design epistemology are presented as well as exemplars of how these can be translated into questions which can guide the development of a framework of design suitable for education.

Norman and Baynes (pp. 93-100) conclude the book with a single chapter in Part 6. They offer a clear and coherent overview of some of the points addressed in the previous chapters relative to the Expert Panels' review and conceptions of design epistemology. Clearly stating the aims of this book, they put forward an agenda to create a framework for design epistemology which is helpful to anyone in better understanding the nature of design, its human significance and its value. Finally, in an attempt to drive this agenda forward, they culminate on a number of pertinent key matters for discussion.
Overall, this book was very enjoyable to read. I read most of the chapters more than once and I envision that I will regularly refer to many of them in future discussions on knowledge in design education. The book will certainly provoke thought in terms of design epistemology. On one hand there is a clear need for the ill-defined nature of design in education and it is difficult to conceive of how this isn't a unanimously shared point of view. On the other hand, you can appreciate the difficulty that would exist in appraising the subject due to its insufficient "disciplinary coherence". This is a clear issue which needs to be addressed in some form, but reflecting on the discussion of the tacit nature of designerly knowledge it is clear this will ultimately look different to that of other subjects. Upon finishing the book I suspect most readers (at least those with an interest in D&T education) will be eager to engage in the seminars proposed in its concluding discussion.

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