

Book Review: Pedagogy for Technology Education in Secondary Schools

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Williams and Barlex have edited an authoritative book about pedagogical practices in design and technology education. The subtitle states that it provides 'Research Informed Perspectives for Classroom Teachers' and with this in mind our primary criterion for reviewing this book is: Is the book suitable for teachers? With secondary criteria: Will it contribute to their work in the classroom and thinking about their practice? Is it accessible to this audience? Does it include new and challenging ideas?

Williams' opening chapter sets out a clear context and direction of the book but if the reader overlooks this chapter they may miss the book's intent. The introduction is helpful and clearly establishes what this book is about. Williams' synopses of each chapter will help readers understand the 'bigger picture' and provides an entry route into some of the new and complex ideas explored later in the book.

To review the book, one of us selected 3 of the 16 chapters that appeared from the title to be particularly relevant to his classroom practice: Kay Stables' chapter, *Signature Pedagogies for Designing: A speculative framework for supporting learning and teaching in design and technology education*; Torben Steeg's and David Hills-Taylor's chapter, *Pedagogy for Technical Understanding*; and John G. Wells' and Didier Van de Velde's chapter, *Technology Education Pedagogy: Enhancing STEM learning*.

Stables' chapter on *Signature Pedagogies for Designing* provides a pragmatic and accessible summary for teachers of design pedagogies. The pedagogic design tools introduced in the chapter are referenced closely to the practice of the subject of design and technology, grounded in evidence-based research of others throughout, thus being a pertinent and essential read for those involved in classroom practice.

The glossary included at the end of the chapter gives comprehensible descriptions of each tool, detailing what these are and how they can be applied in teaching and learning, with links and references for those who may wish to explore these ideas and tools further, which is easy to digest. An illustration of this is Stables' mention of the pedagogy of 'body storming', where she gives an uncomplicated description of the tool being 'it involves creating a physical situation through which a learner can experience specific needs, such as poor vision and lack of mobility'(p.115). Stables goes on to exemplify how this could be used in practice in the

classroom to 'simulate user testing of models and prototypes as their [students'] design ideas evolve'. All pedagogies described in the glossary are presented in this same accessible format. This table of pedagogical tools is useful, and whilst the pedagogical tools listed are somewhat limited, they are a strong starting point for classroom teachers to prompt thinking and further exploration. Therefore, this chapter met Stables' aim of 'speculating on a fresh way of considering the nature of a pedagogic framework' with 'an ambition for teachers to implement the approach proposed' (p.114).

Steeg and Hills-Taylor's chapter concentrates on the teaching of 'technical' aspects of design and technology teaching – 'the elements of a technology (e.g. aspects of electronics or structures) that together make it work' (p. 177). Through the lens of factual, procedural, conceptual and tacit knowledge, Steeg and Hills-Taylor present a meticulous dissection of what is meant by technical 'knowledge' and how it can be delivered through selecting effective and appropriate pedagogies. Their discussion provides a timely perspective in light of the current discussions around knowledge-rich curricula in schools. Steeg and Hills-Taylor examination of forms of knowledge challenges teachers to think about how we can effectively deploy these pedagogical methods by contemplating about what knowledge is being taught. They give helpful examples of how their ideas might be used in the classroom through the inclusion of case-studies and reflection sections on the success of these approaches with students in the classroom. For example, Steeg and Hills-Taylor make their discussion of teaching technical knowledge highly relatable to the English design and technology classroom with particular reference to teaching technical understanding of the scientific elements of the new post-14 specifications being taught in England and providing in the chapter three pedagogical approaches.

Whilst Steeg's and Hills-Taylor's chapter will encourage teachers to consider what knowledge they are teaching and how this might be taught, although the question is - are the pedagogical approaches explored in the chapter new or novel and should the authors have considered how the approaches they discuss related to current lexicon, such as knowledge organisers similarity to chooser charts. However, what this chapter importantly provides is an opportunity for teachers to really consider what forms knowledge are used in designing these pedagogical approaches and this will prove extremely useful in creating effective teaching resources.

Wells and de Velde's chapter on pedagogy for *Enhancing STEM Learning* sets a great deal of background of what STEM (science, technology, engineering and mathematics) is, but seems somewhat more distant from how this might be taught using different pedagogical tools by design and technology teachers. Wells and de Velde provide an excellent background insight into the development of STEM learning and what this interdisciplinary concept consists of and has a clear focus on how STEM could be integrated into the curriculum. However, this chapter would have benefitted from some more tangible approaches to interdisciplinary teaching of these subjects. Wells and de Velde discuss how approaches such as problem scenarios and design challenges could be used for teaching STEM learning with some good examples of student work from teaching of STEM but it is unclear how novel this perhaps is from what many schools already do. However, this chapter will be useful for teachers new to teaching the interdisciplinary learning of STEM.

We provide this critique of three chapters as a taste of the other chapters. The other 13 are similar in that they provide teachers with thought provoking ideas and suggestions that could influence their classroom practice. A few chapters include vignettes intended 'to illustrate the discussion and prompts for reflection, which can be used by the reader to guide their contemplation' (p.1) and where these appear, they are helpful.

Having read the book, we think *Pedagogy for Technology Education in Secondary Schools* is a timely addition to the growing literature available for teachers to peruse and expand the knowledge, thinking and ideas about design and technology pedagogy. However, this endorsement comes with some caveats.

With many teachers subscribing to the 'What Works' movement and conducting research into their own practice, there has been an increase in the demand for books about pedagogical ideas and practices for design and technology. However, if that is what readers are looking for in this book, they will be disappointed. That is not to mean that this book is disappointing – far from it – but rather that it is a book in the long tradition of publications from Springer about technology education, in that the contributors sometimes write in a style that makes it challenging for non-academics or teachers, with little time to sit and digest the whole intent of a book, to access. So, this is where the unusual 'Synoptic Review', written by the second editor David Barlex, comes into its own. Barlex summarises and offers his own perspective on each chapter, which we think teachers will find helpful in exploring the potential the perspectives presented could have on their classroom practice. But we wondered if these summaries would have been better placed immediately following the chapter and possibly co-produced with the chapter's authors.

There are two other topics that need addressing: the price and diversity of authors. Firstly, to date the book's price point has unfortunately caused more discussion on social media than the content. As teachers are wanting to know more about research in the field a book retailing at over £85 for an e-version is prohibitive to many and potentially makes this an exclusive publication with only institutions purchasing a copy, not individuals. Publishers, such as Springer, are known for their scholarly books and command a high price, although the justification for this is not necessarily appreciated by classroom practitioners. So, the decision lies with editors and authors – do you write for a scholarly publisher but thereby excluding those who would gain most from the content or do you write for publishers whose price point is more accessible to the intended audience but where the academic kudos may be less? We raise these points not to criticise the editors instead to add to ongoing debate about accessibility to new thinking as part of an inclusive community. Second, with contributors from a variety of jurisdictions the book goes some way to decolonizing the design and technology curriculum and field due to the locality of the 24 authors, although we note they are predominately Western, white and male. Addressing this diversity will take time and future editors will need to be more mindful about how their books ensure that black lives do matter.

To conclude we return to our criteria for judging this book. Yes, the book is suitable for teachers particularly if they read the opening and closing chapters first. Yes, it will contribute to their work in the classroom and thinking about their practice as we show with our evaluation of 3 chapters (rest assured - the others do the same). If we were scoring its accessibility, we would award 3 out of 5. The range of topics means there is something for everyone, but the style and

structure could be off putting to some; the cost excludes some as does the representation of people of colour and gender. Finally, yes - there is much here that will challenge accepted practice. This is a useful book for institutions to purchase.