Book review: Debates in Design and Technology Education (2nd Edition), Hardy, A. (ed) (2022)

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Introduction

This second edition of Debates in Design and Technology Education is situated within the somewhat precarious position that design and technology currently (still) holds in schools in the UK, and we are reminded of this context at a number of points through the book. At the same time, as stated by Alison Hardy in the introduction, it is also an acknowledgement of the new generation of research emerging within the subject, and as such is presented in part as a renewal or reframing. Much has happened, politically, socially, environmentally and technologically, since the first edition of Debates was published in 2013, and this second edition is a clear reflection of the related developments, though also at times the lack of development, in design and technology education. This volume presents debates around the subject in three distinct sections: political and international debates, the nature and perceptions of the subject, and classroom teaching, which provide the framing for the review that follows.

Overview of chapters

Part I opens with *Government policies and design and technology education*, in which Daniel Wakefield and Alison Hardy succinctly trace the subject's struggles with identity since long before, and indeed long since, its inception in the national curriculum in 1988. Up to the current (2014) curriculum for D&T, the authors account for the fluctuations of the subject and yet point out that the core aims of D&T have remained a constant presence since 1988, and this chapter provides the backdrop for much of what follows. To complement this, Chapter 2, *International perspectives on technology education*, Frank Banks and P. John Williams provide summaries of international approaches to the subject from nine countries, positioning these alongside the four separate approaches from devolved responsibility for education within the UK. The ensuing summaries oscillate in curriculum focus between technical vocational and skills-based approaches that may be directed towards countries' economic wellbeing, and the more holistic approaches to the subject that promote personal, environmental, cultural and planetary wellbeing. When we do arrive at the UK curricula, the core aim of creativity and imagination stands out as an important driver across all four approaches.

The final chapter in this section is arguably its most significant. The authors of Chapter 3, *How do we do race in design and technology?*, begin by suggesting that this may be the first example of a dialogue on issues of race and racism for D&T, and this is certainly concurrent with my own reading and experience. The chapter is therefore intended by Bhavna Prajapat, Rose Sinclair and Alison Hardy as a conversation starter, and as such it brings together a wide variety of issues and considerations in order to open up the space for change. Notably, the authors point out that while representation of diversity in D&T is important, as a response to decolonising this is insufficient and there is a need to "reclaim, reconnect, reapply and regain the use of methodologies, and design practices, that have been submerged or hidden or marginalised because of the community from which they come" (p.46). In light of this, it is just a little noticeable that the teacher narratives towards the end of the chapter deal almost entirely with

issues of representation, with little mention of the deeper issue of methodologies in practice. That the final narrative, from NSEAD's Marlene Wylie, sets out the approach to anti-racism from the subject association for art and design perhaps points glaringly to the fact that in D&T we are not there yet. As the first of its kind, this chapter and the teacher narratives do an important job in laying out the ground for the discourse on race and racism in D&T, and lack of representation as a problem is real. However, there is clearly much more to do, and I look forward to what follows and to future volumes that discuss the more complex issues touched on here.

Part II takes us into debates around design and technology as a subject. In Chapter 4, *Why did design and technology education fail, and what might replace it?*, David Spendlove presents a critique of the current situation through consideration of the networked and complex political, pedagogical and organisational ecosystem for D&T in the UK. As well as to highlight the complexity of the situation, this serves to position change from within an ecosystem which is distinctly different to that which conceived the first iteration of the subject. While the path to the current situation for D&T is well trodden (Barlex, 2007; Miller, 2011; Owen-Jackson, 2013), the value of Spendlove's analysis here is through his networked approach, which offers a way of understanding, perhaps even accepting, the status quo and, he hopes, of opening up ways to take action from *within.* This sets up McLain's positioning of signature pedagogies for D&T in Chapter 5 very well.

Acknowledging the value of practical skills and processes, in Chapter 5, *What's so special about design and technology anyway?*, Matt McLain argues for renewed attention on learning intentions through careful consideration of pedagogy and alternative approaches to the signature 'project', which he suggests is the deep structure of D&T's pedagogy. This, he argues, can overcome problems associated with a dominant focus on the practical or material outcome of a project, and can be achieved by reframing the conventional designing, making and evaluating into the fundamental activities of ideating, realising and critiquing. Usefully, McLain models what he terms the four-fold approach through treatment of examples taken from DATA's project bank. In naming D&T practice through his extensive exploration of the signature pedagogy in this chapter, McLain is making a case for a D&T paradigm that, he argues, should be both celebrated and challenged, but that stands up to prevailing disciplinary and knowledge-based approaches.

Chapter 6 provides something of a departure at this point, in discussing *Does food fit in design and technology?* In this chapter Suzanne Lawson and Susan Wood-Griffiths present a range of views on this debate against the historical backdrop and Lawson's own previous arguments that the inclusion of food in D&T was simply a matter of survival (Lawson, 2013). The following sections include discussions on the relationship between food and health, supported by debate around high profile celebrity campaigns, and consideration of some of the social, cultural and socio-economic ramifications of the NEA unit of the (2016) GCSE specifications. What seems missing here are deeper discussions on, for example, issues concerning the removal of Food from the D&T GCSE, the subject knowledge content in the GCSE specifications, and indeed on how food is currently taught in schools at key stage 3. Nonetheless, the authors conclude by pointing out that 'Does food fit?' may be the wrong question, which, they argue, ought to be about how food education can be fit for purpose. That it feels like something of an odd fit at

this point in the book probably says more about the challenges still surrounding food's place within D&T than anything else.

If we take McLain's Chapter 5 as suggesting a pedagogy of process, then Chapter 7, Mike Martin's *The role of making in D&T*, is perhaps a more natural follower. Notwithstanding, and also embracing, the advances of technology in the last 30 years, Martin develops the rationale for making in the curriculum in relation to knowledge when both designing and consuming; to designing, modelling and decision-making; and to the cognitive benefits of simultaneously thinking and acting. This is followed by consideration of teachers' resources, subject knowledge and experience, and the sometimes uncomfortable imbalance between what may be possible within a school and how products are designed and made in the world outside school. This is a brief but emphatic call to carefully planned making activity as a way of learning about being human and living in a technological world.

Chapter 8, *Entrepreneurship in technology education*, focuses attention a little more in the world outside school. As Andri Du Toit points out, education about the world of work is a concern of global proportions and yet this is not widely embedded in technology education. The chapter initially examines the role that technology education can play, principally through the multifaceted design process, in developing in young people the '21st century skills' needed in the world of work. Putting this into practice, though, requires careful consideration and suitable training for teachers, and Du Toit considers some of the difficulties of this before discussing how it might be done. The range of proposals that follow are largely concerned with the contextualisation of learning around real-world scenarios that develop entrepreneurial knowledge, skills and competencies. That Du Toit examines the debate through global perspectives is refreshing at this point in the book and helps to take the reader and D&T beyond the UK classroom in more ways than one.

In the penultimate chapter in this section, *Gendering the curriculum*, Ulrika Sultan acknowledges the ongoing gender difference in uptake and engagement in D&T globally, before suggesting that certain factors contributing to this may be socially constructed. This, she points out, includes among other things gendered self-perception of intelligence from an early age. Though initially considering this through the lens of education, Sultan reaches beyond education to the interdisciplinary field of gender studies and presents an examination of four theories grounded in sociology, interspersed with suggestions for D&T educators and key areas in which stereotypes may be disrupted. Sultan ultimately concludes by discussing approaches to gender-conscious pedagogy, and the nuanced and multi-layered considerations that teachers can make towards broadening pupils' self-perceptions and horizons in D&T. This is an engaging and thorough chapter that grasps hold of the gender debate for D&T and positions it squarely in the socially constructed classroom.

In the final chapter of Part II, Sarah Davies addresses *Managing curriculum change*. Davies pertinently frames the typical drivers for change through research that identifies natural events, policy reform and voluntary reasons, this last including "dissatisfaction, inconsistency and intolerability with the current situation" (p.150). Given the backdrop of previous chapters, the scene is set for considering more closely how it might be done. Davies goes on to briefly discuss how teachers might deal with change, how teachers might be enabled to respond, and factors during change processes that might be alienating or disempowering. The second half of

the chapter is given over to a series of case studies that provide three very different examples of curriculum change, driven by both external and voluntary reasons, and in their breadth help to underscore the place and need for change in D&T. Summarising these challenging but largely positive experiences, Davies gently but clearly exemplifies some of the opportunities to upgrade from within that Spendlove highlights in Chapter 4.

Part III is concerned with teaching design and technology and begins with Dawne Irving-Bell's *Influence of teachers' perceptions of subject knowledge on pedagogical approaches*. Chapter 11 examines the relationship between teacher perceptions of pedagogical content knowledge (PCK) and their efficacy and impact, and this is contextualised around the current challenges of teacher recruitment and retention, curriculum marginalisation of D&T and teachers delivering lessons beyond their immediate areas of expertise. Through the analysis of a range of issues relating to PCK Irving-Bell touches on opportunities for the co-production of knowledge between pupils and teachers, pupil-led learning activities and those that promote risk taking, for example, all for the facilitation of greater engagement and deeper learning for pupils. All of this, we are regularly reminded, requires the confidence of the teacher in the moment of transforming subject matter into accessible and engaging learning material (PCK), and as a starting point at least, being mindful of the need for confident content knowledge is a key take away here.

In Chapter 12, *Transition between primary and secondary school*, Cathy Growney takes as a starting point the 'glaring' differences in teaching D&T between primary and secondary phases, and research that suggests regression in learner autonomy and progress in D&T from Year 6 to Year 7. This sets up an analysis of strategies and approaches that may be taken to avoid this, focusing on structured dialogue and partnership learning between primary and secondary teachers. Considering obstacles such as planning and delivery time, resources and commitment, Growney concludes with some notes of optimism, noting in particular the opportunities that arise from a greater focus on iterative designing and collaboration in secondary curricula which is more resonant with primary approaches, alongside the foregrounding of pupil well-being when it comes to transition.

Chapter 13, *Teaching for technological justice: Embracing indigenous designs*, joins Chapter 3 in signalling a significant shift for D&T in terms of inclusion and diversity, in which Mishack Gumbo foregrounds indigenous knowledge as a way of achieving justice and decolonising for indigenous learners. Gumbo has long advanced the importance and position of indigenous knowledge in technology education (for example Gumbo, 2017, 2020) and this chapter represents to the UK D&T community an important acknowledgement of the relevance of this work in both indigenous and non-indigenous contexts. Technology, argues Gumbo, is deeply implicated in colonialism, marginalisation and oppression, and this provides the springboard for the ensuing discussion on reclaiming indigenous knowledge of technology from colonialism in India, Zimbabwe, Australia and South Africa. Gumbo goes on to demonstrate a model for teaching technology education for indigenous learners, and importantly for this book, in non-indigenous contexts where indigenous learners are in diaspora. In this second model, teachers are encouraged to consider the relevance of D&T to indigenous and not just Western contexts, and this demonstrates one possible approach to the methodologies of teaching for justice, beyond just representation as highlighted in Chapter 3.

The final three chapters of the book centre around the roles of cognition, critical thinking and feedback in D&T, and are usefully positioned together in considering how, when and where aspects of learning take place. In Chapter 14, Design cognition in design and technology classrooms, Nicolas Blom presents two prevalent theories of cognition: information processing, which distinguishes between thought and action, designing and making; and ecological psychology theories, in which design thinking is considered largely to be external and embodied, with sense-making embedded in cycles of action in the physical and material world. Identifying problems with each, Blom advances a new theory, Extended Design Cognition, in which attention is paid equally to internal and external influences, and which necessitates careful consideration from teachers about how and why learning environments and learning activities can support learner cognition.

Following this, in Chapter 15, A hybrid design sketching approach that can drive critical thinking in design and technology, Yaone Rapitsenyane, Richie Moalosi and Thatayaone Mosepedi present their research with undergraduate students in Botswana in advancing hybrid sketching as an intuitive practice between traditional pen and paper and digital methods. The authors argue that the skills associated with sketching bear relevance across all phases of education and in professional practice, and in presenting this hybrid model they are making a case for the benefits of traditional manual methods within the current tide of digital influence. The study suggests that sketching holistically supports critical thinking and creativity, and the authors emphasise transferability to the secondary context through cross curricular links to art and design and the importance of practice, metacognition and reflection. What is not discussed here are the possible challenges some teachers may find in using and teaching for these digital skills, but this is where Chapter 11 and PCK may come in handy.

Finally, in Chapter 16 Alice Schut discusses *Exploring the potential of feedback within the creative processes of a design and technology classroom*. Presenting findings from research, Schut centralises the designerly notion of critique to support pupils' creative cognition and points out that it is not a question of if, but how and why design feedback should be used in the D&T classroom. Feedback in this case is argued to be a shared endeavour that encourages pupils to think independently to make sense of and sort out a multitude of possibilities. Challenges of giving feedback are considered, principally concerning quality and challenges around interpretation and the predominance of convergent questioning, as well as those concerning receiving feedback, which include pupils balancing emotions and knowing how to be active receivers. Particularly useful in this chapter are the suggestions for implementing design feedback practices in the classroom, which involve pupils learning through regular practice of high quality feedback supported by explicit teacher guidance, as well as the discussion of findings around pupils' developed cognitive modelling and evaluative abilities and the guided nature of activities encouraging pupils to take an active role in the process.

Conclusions

Just as the first edition of Debates followed some critical movements in design and technology education, so does this second edition come at an important time for the subject and its future. For me, one of the most useful aspects of the book is Spendlove's examination of the ecosystem that constitutes the current state of play for design and technology education. Through this viewpoint on the entangled networks involved, it is possible to position change, and the potential for change, from within any number of factors, and the chapters that follow

from this point do all contribute to the renewal and reframing that Hardy sets out as a key aim of the book.

At a few points the ordering of chapters feels a little disjointed, and there are opportunities to make more of the networks and networking between themes, either explicitly or implicitly. However, as commented above, this perhaps speaks to the complexities of the situation D&T finds itself in, and bringing together such a range of issues and possibilities into a fully cohesive whole is challenging to say the least. Where there are crossovers with the previous edition (debates on making, food, gender, and primary transition for example) these are generally, and sometimes radically, updated and reflect developments in theory and broader socio-political shifts that, as argued in these chapters, maintain the relevance of the D&T curriculum in schools. These debates are also now joined by those on race, indigenous knowledge, entrepreneurship, design cognition and others, and although there is clearly much more to do, each of these sets up a different way in to the debate on 'What now?' which is no small or isolated task. Overall the book treads some careful lines between where the subject has come from, where it is and where it could be, and although Hardy acknowledges that there are many areas and debates that have not been included in this volume, those that are included are well pitched and position D&T within a rich research base that offers plenty of possibilities.

References

Barlex, D. (2007) *Design and technology: for the next generation*. Whitchurch, Shropshire: Cliffe.

Gumbo, M. T. (2017) 'Alternative Knowledge Systems', in *Critique in design and technology education*. Singapore: Springer. pp. 87–105.

Gumbo, M. T. (2020) Technology Teachers' Understanding of and Attempt to Integrate Indigenous Technology in Their Lessons. *Africa education review*. 17 (5), 39–55.

Lawson, S. (2013) 'Does food fit in design and technology?', in *Debates in design and technology education*. London; New York: Routledge, Taylor & Francis Group. pp. 101–114.

Miller, J. (2011) *RSA Design & Society: What's Wrong With DT?* [online]. Available from: https://www.thersa.org/discover/publications-and-articles/reports/whats-wrong-with-dt (Accessed 2 September 2019).

Owen-Jackson, G. (ed.) (2013) *Debates in design and technology education*. London ; New York: Routledge, Taylor & Francis Group.