

Teacher as Designer. 2021. Singapore: Springer Singapore.
Editors David Scott and Jennifer Lock
Reviewers: Daniela Schillaci Rowland and Alison Hardy

Practitioners are the intended readers of 'Teachers as Designers', serving 'as a guide to practitioners that links theory and practice with regards to design-based processes in education'. The two editors, David Scott and Jennifer Lock from the University of Calgary in Canada, have curated contributions from Canadian academics and classroom and school-based practitioner, however they do refer to theory and practice outside Canada.

The book is divided into three sections: differing perspectives on educational design, key actors within educational design and new possibilities for design in education. The first section examines design processes in education, the second presents how teachers, leaders and pupils can be involved in educational design, the final one focuses on design within maker and making contexts. Although the final section appears to be of main interest to those involved in design and technology education, we think there are chapters in the other two sections that are also of interest.

Each chapter follows a similar structure: brief abstract, keywords, guiding questions and is bookended with a vignette of a teacher rethinking an established curriculum activity. The guiding questions are meant to help any reader gain the most from the chapter, however some are too narrow in their focus.

We, the reviewers, work within design and technology education; one at an English secondary school, the other a UK university. We found there was something for both of us in the book's chapters and reviewed the chapters we thought related most to our interests and contexts. Daniela reviewed chapters 2-4, 8 and 9 and Alison looked at chapters 1, 5, 6, 7 and 10.

1 Considering the Human in Human-Centred Design by Sandra Beck

This chapter's vignette describes a teacher who wants to move from a superficial outcomes-based learning activity towards one that takes a human-centred design (HCD) approach. First, the author provides a brief and limited history of HCD. Next, she argues that a technical stance often leads to superficial solutions that rarely consider stakeholders, whereas a designerly approach views problems as 'multi-faceted and complex' (p.12) giving more freedom to take risks. To help teachers manage these risks, the author presents 3 models of design that could be used in education: the Double Diamond, the d.school at Stanford University's 'Design Thinking Bootleg' and Cooper Hewitt, Smithsonian Design Museum's K-12 Design in the Classroom. This chapter provide a good introduction to the rest of the book, but readers experienced and comfortable with taking a designerly approach may find it too simplistic.

2 Reframing Inquiry in Education: Designing for a Living Curriculum by David Scott and Deirdre Bailey

The foremost intention of this chapter is to shift the mindset that inquiry-based learning is confusing and too open. To do this, Scott and Bailey use several points of research and pupils as co-architects.

They explore inquiry based learning using the Double Diamond model (2019), despite some resistance from policy makers. What draws you to this chapter is the introduction-a keen, enthusiastic teacher who finds himself questioning his own practice, a common theme for some early career teachers. Excellent teacher preparation, alongside student's assistance in driving authentic forms of inquiry. It does come with a warning; that 'it should be noted that designing for rich inquiries is a deeply iterative and recursive process.' Rich inquiry is needed, but how it is structured is where change can materialise. This chapter highlights issues surrounding education policy; sometimes even the best concepts face barriers outside their control, but with careful preparation and planning in your individual setting, Scott and Bailey believe it can lead to authentic design inquiry experiences for students.

3 Designing Learning Through Universal Design for Learning by Evelyn Hickey

This chapter focuses on how taking a universal design approach it is possible to design learning approaches to reduce students' barriers to learning, thereby creating a more inclusive environment. It begins with a discussion about Universal Design for Learning (UDL) that includes three principles: engagement, representation and expression. Each of these are described in turn and a helpful list of questions is provided for teachers to use with planning. Later in the chapter, Hickey shows how a lesson can be designed through the lens of UDL. The arguments presented are persuasive and would be useful for beginning teachers to read.

4 Teacher as Designer of Learning; Possibilities and Praxis of Deep Design by Stephanie Bartlett

Collaboration and trust are two keywords for this chapter. This is by no means 'does exactly what it says on the packet' guide; however, the fundamental characteristics are basic and will lead students to develop skills that will help them when stamina is needed for longer blocks of learning. Bartlett states that using dialogic pedagogy will help to promote asking those high-order, open-ended questions that lead to deeper levels of engagement and learning. To be able to achieve this however, the teacher needs to have a repertoire of skills to help scaffold the activities. The discussion about what disposition for design in education is, and how it can be used by educators to think about their own practice, and is heavily supported with some excellent research. The chapter then leads to how the principles might be applied-it is about building relationships and confidence in pupils to ensure they feel comfortable to take risks-this is where the magic of learning takes place. What finishes the chapter off nicely is the exploration of surface design challenges versus deep design; it is the surface design challenges that build the skills, whilst deep design can only occur once collaboration and trust have been developed through short focused design tasks.

5 Students as Designers by Erin Quinn

Students having fun and being enthusiastic in a lesson, does not always mean that students are learning key concepts, as discovered by the author of this chapter. This chapter addresses this issue by seeking to empower students and to become co-creators of their own curriculum. With the focus on innovation, critical thinking, problem solving and communication, the hope is that it will lead to collaboration amongst the students, where

these skills can be used to establish deep design thinking. Quinn champions the need to build confidence in pupils so that they become change-makers. The example of how the pupils at the Riverside School in India help to solve issues locally, and in collaboration with different communities, provides a good example of how teachers who provide a non-failure environment, and develop design thinking in their pupils, can lead to real change.

6 A Voice of the In-Between: Design Thinking and Heart-Centred Leadership by Ankush Garg and Katherine Culhane

This chapter is a case study about how design thinking principles can be 'infused' into educational leadership practices. The authors describe their experiences as curriculum leaders responding to policy and curriculum changes in western Canada using 'heart-centred leadership' (p.85). Heart-centred leadership is described as a style where 'leaders seek to bridge multiple stories, perspectives and needs of the community through collective decisions and actions' (p.91). This complexity and ensuing tensions of managing 'wicked' problems affected by policy shifts, changes to curriculum and other government agendas, will be familiar to most educators regardless of location. The authors explain how they took a design-thinking approach to design 'a human-centred educational system' (p.91); their approach had three principles: inspiration through empathy, ideation through radical collaboration and enactment through iteration. Although this chapter may not be directly relevant to all D&T educators, it does serve as example of how design language and activities are being adopted beyond the design classroom.

7 Design Thinking Through Passion-Based Learning Janette Hughes and Laura Morrison

The authors define passion as a driver or evidence of students' engagement, excitement and progress; they see a student-directed approach as being 'passion-based'. The chapter reports on a study undertaken by the authors of a 'week-long passion project guided by the design thinking process' (p. 104) with a group of 15 children aged between 7 and 14. The premise was that for students to engage in the project with passion the focus had to be something the students cared about. What the authors describe is recognisable as an open-ended design project, where students have agency to make design decisions about their work and what they need to know. This chapter's strength lies in the honest and recording of the project's aims and process, plus the challenges and useful suggestions. The authors provide a useful case study of a student-led, open-ended design project that would be useful for beginning teachers to discuss, and experienced ones to reflect on and critique; the five principles of design at the end of the chapter are a helpful discussion and reflective framework.

8 Re-imagining Assessment: Assessing Design Thinking Within Makerspaces by Sandra Becker and Jennifer Lock

In this chapter, Becker and Lock state that identifying and assessing transversal (transferable) skills can be difficult to do within the realms of makerspaces. Giving students

the opportunity to explore, tinker and discover different materials and products can lead to many lines of inquiry, which pupils then begin to research and answer. Becker and Lock draw on the use of the Makerspace Assessment Framework (2018), and designerly thinking. In order to assess the design stage, teachers need to be flexible in their approach to assessment. The example given, in the form of a table, is a great way for educators to begin that internal dialogue about what and how to assess. Teachers need to draw and reflect on many different viewpoints and exploring different avenues of assessment; a comprehensive list is also included in point five. The 'principles of design' at the end of the chapter provide a clear and concise starting point. Flexibility, good background research and considering different stances is ultimately what make this study a success.

9 Design Principles for Teaching Sustainability Within Makerspaces by Paula

MacDowell

The opening vignette paints a picture that connects the reader to this chapter; curiosity of design, as a child is one that many can relate to, though thinking about the life-cycle of the products possibly did not feature. Sustainability is a key factor across aspects of design, so it can be difficult to teach students to put this at the forefront of their thinking when using makerspaces to explore avenues of design thinking. This chapter serves to guide students in using their own integrity and values to encourage others to consider sustainability in their own learning. Petrina's (2000) ideas about sustainability are used to challenge teachers to re-evaluate prioritising sustainability when considering how to teach students about the use of makerspaces and design development. The result of the research led to Tech for Change Makeathon 2017, where students produced digital technology to help people consider how they can have a more positive and sustainable impact on the world.

10 The Future of Design Thinking in Education: Challenges and

Possibilities Jennifer Lock and David Scott

Editors Jennifer Lock and David Scott close the book with a summation of the challenges and possibilities of using design thinking in education. The concluding chapter reminds readers that the chapters are based on examples of experience, they are not there as a template to follow which would contradict the book's notion of the teacher as designer.

The editors acknowledge the challenges of shifting towards using a design process to improve education, such as resisting current trends in a 'back to basics vision of education' (p.152). To do this, they argue, educators and teachers need to 'think like a designer' - this book is a useful starting point for those unfamiliar with this approach and provides some useful insights and reminders for those more familiar with taking a designerly approach.