Design and Technology Education: An International Journal

26.1

Book Review

Learning to Teach Design and Technology in The Secondary School: A Companion to School Experience

Hardy, A. (Ed.). (2020) Learning to Teach Design and Technology in The Secondary School: A Companion to School Experience. 4th Edition. Routledge, Abingdon, UK

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This is the fourth and fully updated edition in this series of books. The book is aimed at those who are training to teach design and technology in the secondary school. The areas covered include subject knowledge, subject pedagogies, underpinning philosophy and the wider issues that will support an understanding of the purpose and potential of design and technology education.

Although the book purports to be for secondary trainee teachers, there are some chapters that would be useful for all teachers/mentors of design and technology, primary and secondary.

In this publication, Hardy has brought together contributions from practicing teachers, researchers, consultants, writers and academics to share their experiences and insights creating a collection of invaluable resources for those '*who aspire to become effective, reflective design and technology teachers*' (page i). A summary of each chapter as well as powerpoint slides to accompany these chapters have also been created and can be found on Alison Hardy's podcast and blog site: https://alisonhardy.work/teaching-dt/lttdandt/

This book covers all areas of design and technology and is divided into four parts. Each part starts with a brief overview and rational for that part of the book.

Part One: From the history to the present day.

Chapter 1: Design and Technology in the Secondary School by Alison Hardy

For those who are new to design and technology education, Hardy gives an overview of the 30 years history and the subsequent changes in the curriculum content and teaching design and technology as part of the national curriculum in England. The chapter starts with the nomenclature, reinforcing that the subject abbreviation needs to be 'D&T' and not 'DT' and this

differentiation impacts on creating personal rationales and the underpinning to help define the philosophical understanding of how the design and technology curriculum can be constructed and taught well. Hardy takes a global stance to look at 'design and technology' education across other countries and how curriculum across the world have different emphasis. There is an exploration of some interesting ways of looking at 'subject knowledge', 'subject aims' and 'subject epistemology' that still remain as areas of debate in education.

Chapter 2: Design and Technology in the Primary School by Clare Benson

The chapter on primary design and technology is particularly interesting for secondary design and technology teachers. Reading this chapter gives an insight into what children learn in primary design and technology and how the secondary curriculum needs to build on this knowledge to avoid repeating what has already been taught and ensuring that there is progression and challenge in key stage three. Benson goes into detail about the different approaches primary educators takes in developing the curriculum for children to access skills and knowledge across the breadth of the subject in the national curriculum. She also explains the issues of how subject was introduced in primary education and the content of teaching design and technology in an ordinary classroom.

Part Two Design and Technology Curriculum

Part Two covers the design and technology curriculum for secondary schools and here there are some ideas that are useful for primary trainees also. The aim of the content of the first six chapters is to give an outline of the curriculum content of a specific area under the design and technology subject area: designing, materials, textiles, electronics, and food. Some chapters start with a brief history of the subject and this is helpful where there are literature links to follow up on. These chapters go on to list subject content from which the trainee teacher could develop a personal subject audit and identify areas for development, to gain a good subject knowledge. Most chapters refer to examination specifications and some mention the diverse types of exams and their content. Three of the five remaining chapters are new - the role of critiquing in design and technology education, transitions after secondary design and technology, and using and producing design and technology education research.

Chapter 3: Designing in Design and Technology by Paul Woodward

Woodward uses some interesting ways to breaking-down and defining words like 'design and designing' and the relationship with creativity and innovation. Much of the content in this chapter is driven by Woodward's extensive and successful experience of teaching design, designing, and learning to design. There are some outlines of strategies to develop ways of designing and ways in which to promote design thinking to move away from uninspired design outcomes. Many of these could be selected and developed for classroom use.

Chapter 4: Teaching Design Communication Skills by Jamie Tinny and Mike Mellors

Tinny and Mellors start with a brief history of design and communication although the dates or references are not included. There are some helpful suggestions for the concept of designing. Some of the activities in this chapter are thoughtful, particularly the one relating to the exploration of examination specifications. There is some exploration of children's resistance to

drawing and production of unimaginative designs that often challenge teachers of design and technology. The chapter goes on to explore the examination specifications in this area.

Chapter 5: Preparing to Teach Materials Technology by Alan Bright

Bright gives a brief overview of the history that includes some related key developments, including vocational education, that impacted on the content of teaching design and technology. The chapter is easy to navigate, considering the breadth of the subject content in this area of design and technology – materials (old and new), tools and processes and other areas of knowledge that need to be covered are organised and supportive. Knowledge, skills, and understanding are outlined and arranged to the extent that some could be directly lifted for use in the classroom. They could also be used for long term planning and progression both in key stage 3 (11-14 year olds) and key stage 4 (15-16 year olds). There is clear direction of how to use mind maps to generate the breakdown of skills and knowledge. The guide to auditing subject knowledge in this area would be beneficial for trainee and beginner teachers of design and technology. Although not fully covered, there is a clear direction toward sustainability, as well as direction on some of the smaller things that new teachers may not notice. The chapter comments on maintaining engagement and progression through thoughtful activities. Follow up literature is useful.

Chapter 6: Preparing to Teach Textiles by Suzanne Lawson and Heidi Ambrose-Brown

Lawson and Ambrose-Brown explore the place of textiles in the school curriculum and how it can vary from being taught through art and design or design and technology or both. There is the mention of domestic, industrial, and global contexts for the use of textiles and their different applications. The chapter is organised using headings from the design process generally used in the school setting and helpful for medium term planning. Some of the methods, activities and resources can be lifted to use in the school setting. The chapter later moves into key stage 3 and key stage 4 requirements and this would be useful for long term planning and progression in both key stages for textiles knowledge and skills. The subject content and progression are well presented and useful for both experienced and non-experienced teachers. There is break down of subject knowledge, skills and understanding that could easily be used as subject audit documents as well as identifying areas for learning in textiles.

Chapter 7: Preparing to Teach Electronics and Control Technologies by Tony Cowell

Cowell has taken a global approach and so this chapter is written to include many countries that teach control technologies. It starts with the complex and mixed use of the terminology / labels used by various countries and organisations and how these can often be the cause of much confusion, particularly, when trainee teachers and teachers with little experience in this area, start to teach control technologies. The chapter is well organised, easy to navigate and follow as it starts with the basics, progresses to identify three distinct areas of control, and then gradually moves to the more advanced level of teaching control technologies. There are clear explanations and details of the components, processes, and outputs. The skills, knowledge and understanding are organised in tables to show progression from early to later stages in learning for both key stages. There is helpful advice on teaching and managing the knowledge

requirements. There is guidance of managing the practical elements of teaching control and particularly helpful to think of micro and macro aspects of teaching in this area.

Chapter 8: Preparing to Teach Food in the Secondary School Curriculum by Marion Rutland and Angela Turner

Rutland and Turner start with an explanation of the breadth of food teaching in school requiring even the most qualified food expert to read and learn from this chapter as teaching within a timetable slot in a school is quite different to any other industry. Rutland and Turner discuss the differences in curriculum expectation in different countries. There is a brief history of teaching food in schools utilising some useful references. The chapter is easy to navigate with headings that organise the various aspects of skills and knowledge for the teaching of food in schools. It is noticeably clear about the need to understand that designing in food does not involve drawing and explains ways in which to do this with integrity to understanding food. Tables outline progression for key stage 3 and key stage 4 so especially useful for long- and medium-term planning. There are some useful ideas for managing practical food activities in class. The content is useful for trainee and beginner teachers.

Chapter 9: Teaching about Disruption: A key feature of new and emerging technologies by David Barlex, Torben Steeg and Nick Givens

Barlex, Steeg and Givens rationalise how the place of disruptive technologies in the design and technology curriculum addresses the national curriculum programme of study by identifying the requirement to teach '*new and emerging technologies and their impact*' (DfE, 2014). There is good list of disruptive technologies with a clear explanation of each to select from. The examples/analogies used to illustrate some of the disruptive technologies could be lifted straight from this chapter to use in the classroom with children from later key stage 2 (7-11 year olds), key stage 3 and key stage 4. The content is made richer with references used to support the writing and the sources to follow up on. The exploration and explanation of disruptive technologies chapter is easy to access and use. This chapter is worth reading for all teachers – it presents a fresh way of teaching and creating ways of working to engage children, foster curiosity and challenge the norm. It will lead to design and technology departments wanting to up-date their curriculum content to include disruptive ideas.

Chapter 10: The Role of Critiquing in Design and Technology Education by Steve Keirl

Keirl explores the idea of using critiquing to establish a deeper way of knowing, understanding, thinking, and questioning. Although Keirl explains that this is not just about evaluating skills, there is scope here improve on reflective and critiquing skills needed for evaluations. All the same, the clarity of how critiquing is much broader than this is well explored. Reading this chapter will change the way you approach teaching in all areas of design and technology. Children often struggle with deeper thinking and prompting them to analyse, evaluate or question, can be either a big challenge or sometimes result in pedestrian interpretations. Using the Australian curriculum principles, Keirl explores the strategies for critiquing for different age phases and a range of possible classroom-based work that could be used to help children become more experienced in developing these deeper ways of thinking. This is a supporting chapter for those departments looking to rejuvenate their curriculum content and deepen the design and technology learning experience.

Chapter 11: Health and Safety in Design and Technology by David Leask

Leask starts with why health and safety is important and why trainee teachers need to be accompanied in the rooms with potentially hazardous tools and equipment. This is a good starting point for design and technology trainee teachers as the language is easy to access and getting the basics before starting school placements. Eventually trainee teachers will have to access original health and safety documents and generate their own risk assessments and reading this chapter will ease that path. The chapter also outlines the responsibility of the teacher and the employer. There are some helpful hints and tips on managing safety and a useful checklist for the design and technology classroom. Advice on Control of Substances Hazardous to Health (COSHH) and being familiar with those that you use are explained. Carrying out risk assessments and managing any hazards as well as what to do if you have an accident is also explored. There is some guidance on the different areas of teaching in design and technology. Leask ends with a caution that you need to read more widely than just this chapter to be fully conversant with health and safety.

Part 3: Teaching Design and Technology

Part three covers the teaching of the subject. In looking at the break down here, this part highlights the many elements to planning, teaching, and learning and the paperwork associated with each element.

Chapter 12: Planning Lessons in Design and Technology by Sarah Davies

The lesson planning chapter provides a generic approach to short term planning that covers the main elements of a typical lesson. This is a useful starting point for lesson planning for trainee teachers. Davies has given a clear indication of what a good lesson plan would contain. The distinct phases during the lesson are outlined as well as using Blooms Taxonomy in planning and preparing sources to present rich learning. Reading this chapter gives the underpinning to why planning at this level can help trainee teachers understand the number of activities that the teacher manages in a good lesson. There is also the separate phases of the lesson and transition within lessons that need to be carefully thought out. It also helps to reflect on lessons that are unsuccessful and learning to be prepared. The follow up sources are excellent.

Chapter 13: Key Pedagogies in Design and Technology by Matt McLain

McLain starts with a brief historical overview of the subject history and the pedagogies that came with that rationale for the subject. He covers a range of approaches, activities, and key processes, and explains the unique nature of teaching and learning in design and technology. There are details on skills, knowledge and understanding gained through group work, teamwork, and individual work, giving some interesting insights to reflect on and use when planning the design and technology curriculum. He explores teacher demonstrations, revealing some limitations and challenges in this way of working and leaves you with something to consider when it comes to choosing how to teach a lesson. This is a useful chapter to think about and understand how you organise learning when teaching design and technology .

Chapter 14: Planning for Progression in Design and Technology by Alison Hardy

Hardy starts the chapter with design and technology capability and what this is in terms of knowing and utilising that knowledge in application to design and technology classwork. She then goes on to different formats for planning the design and technology curriculum. Hardy explains how this involves the exploration of long-, medium- and short-term planning where progression of that knowledge can be arranged to be delivered in phases. There are some particularly good examples for curriculum planning. Trainee teachers begin to learn about planning with short term plan, i.e., a lesson plan; and then work their way up to understanding long term planning. However, this is not an easy path and this chapter is particularly helpful in gaining an understanding of why planning, learning to plan for the long term and planning for progression are key to teaching good design and technology. The follow up reading is good.

Chapter 15: Assessing Design and Technology by Suzanne Norris

Norris explains the primary areas of assessment and assessing and why we need to these. The chapter is easy to navigate, and the definition of the most commonly used assessment methods are clearly explained. The chapter gives the underpinning theories for using assessment in the classroom. There are some great strategies that could be integrated in any design and technology lesson. Some key design and technology literature to follow up is included here. For trainee teachers this chapter uses accessible language to gain a good understanding of the concepts that underpin good assessment in school and one to read before starting to assess any work.

Chapter 16: Developing Links with Other Subjects by Deborah Winn

Winn outlines the different curriculum subjects and gives an overview of some of the potential connections that could be possibly made. This chapter is a starting point and there are more ways of creating cross curricular work with other subject departments.

Part four: Developing your design and technology Career

Part 4 starts with values in design and technology and this chapter questions the role of technology in society and how design and technology can generate a deeper understanding of the aspects that are problematic about technology and technologies in the world. There is much here about the greater impact of the subject in the society and our understanding of that impact.

Chapter 17: Values in Design and Technology by Mike Martin

Martin philosophises about values and makes some particularly good pointers to how this could be integrated into everyday design and technology activities to enhance children's learning and knowing. He starts by unpicking the terms technology and technologies. How these are part of everyday life that go unnoticed. How these are used to judge countries, peoples, and cultures. Martin elucidates how technologies shape society, values, and principles. He touches on the impact both positive and negative and using examples to show how children can be taught to notice, to think and to understand the bigger picture. Martin explores ways in which to inspire children to develop skills to recognise values in everyday things.

Chapter 18: Transitions after Secondary Design and Technology by Rebecca Topps

This chapter would be useful for all secondary design and technology teachers. Topps presents a comprehensive list of the qualifications that can be chosen after studying in secondary school. Looking at the post-16 options available confirms how generic design and technology education is in the secondary classroom. There are various routes available and once in the post-16 territory, students would need to know what they would want to specialise in to select the course of study. It is this specialising that would be helpful for secondary teachers to be able to guide their students to the appropriate routes. Knowledge of these qualification will influence curriculum planning particular in the later stages of study and can also inform events like open evenings, parent evenings, developing a rational for the subject, etc. Having this knowledge and using it to promote key stage 4 would likely improve the numbers choosing the subject.

Chapter 19: Your Professional Development by Liam Anderson

Anderson eloquently presents the professional development from a trainee teacher to a fully accomplished classroom teacher. This chapter gives a comprehensive progression from reading an advert for a teaching post, interpreting it, writing letters of application, application forms and the process of a teaching interview. It also gives the trainee teacher tools to look for the correct school setting and planning for a career in teaching with professional development and preparation for advancement. Every trainee teacher needs to read this chapter.

Chapter 20: Using and Producing Design and Technology Education Research by Stephanie Atkinson

Atkinson rationalises how classroom practice continually evolves and how the nature of design and technology is a subject that is also continually evolving. She uses the work of teacher researchers as well as academic researchers as sources to support the benefits of practitioner researcher – classroom teachers have direct access to experiences that need sharing not only with the design and technology community but also with the world to establish more strongly the notable place of design and technology education in the national curriculum and why it should not be side-lined. Atkinson explains how you can get started on your own practitioner research. This chapter would be helpful for all trainee teachers, teachers, teacher researchers and for those tat the beginning of master's level study.

To conclude, this book is a good support for those training to teaching design and technology. It gives new teachers the underpinning history and ways of working and thinking about design and technology. It is a reliable source for gaining insight into good practice and ways in which the subject content in schools can be generated creatively.

References

DfE, 2014. *National curriculum in England: framework for key stages 1 to 4 - GOV.UK*. [online] Gov.uk. Available at: <https://www.gov.uk/government/publications/national-curriculum-in-england-framework-for-key-stages-1-to-4/the-national-curriculum-in-england-framework-for-key-stages-1-to-4>