Cambridge University Press 978-1-107-56156-4 — Technologies for Children Marilyn Fleer Frontmatter <u>More Information</u>

## Technologies for Children

What do we mean when we talk about technology? What constitutes knowledge in technology education? How can we find innovative solutions to complex technological problems?

Technologies for Children presents a comprehensive array of contextual examples for teaching design and technology to children from birth to 12 years. Aligning with the Australian Curriculum – Technologies, this book focuses predominantly on design technologies, with special reference to digital technologies. It provides both theory and practical ideas for teaching infants, toddlers, preschoolers and primary children.

Each chapter explores a different approach to teaching technologies education, along with elements of planning such as project management, achievement standards and pedagogy. *Technologies for Children* provides a framework for critiquing these approaches in order to make informed choices about them.

Drawing on over 25 years of experience, Marilyn Fleer presents clear approaches that are readily applicable in the classroom, and equips students with the necessary skills and knowledge for teaching design and technology education in Australia.

Additional resources for instructors are available online at www.cambridge.edu .au/academic/technologies

**Marilyn Fleer** is the Foundation Chair of Early Childhood Education at Monash University.

Cambridge University Press 978-1-107-56156-4 — Technologies for Children Marilyn Fleer Frontmatter <u>More Information</u>

# Technologies for Children

**Marilyn Fleer** 



Cambridge University Press 978-1-107-56156-4 — Technologies for Children Marilyn Fleer Frontmatter <u>More Information</u>

#### **CAMBRIDGE** UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom One Liberty Plaza, 20th Floor, New York, NY 10006, USA 477 Williamstown Road, Port Melbourne, VIC 3207, Australia 314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi – 110025, India 79 Anson Road, #06–04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org Information on this title: www.cambridge.org/9781107561564

© Cambridge University Press 2016

This publication is copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published as Technology for Children by Prentice Hall 1999 Second edition published by Pearson Education 2004 Third edition published as Design and Technology for Children by Pearson Education 2011 First published by Cambridge University Press 2016 (version 6, December 2018)

Cover designed by Marianna Berek-Lewis Typeset by Newgen Publishing and Data Services Printed in Singapore by Markono Print Media Pte Ltd, October 2018

A catalogue record for this publication is available from the British Library

A Cataloguing-in-Publication entry is available from the catalogue of the National Library of Australia at www.nla.gov.au

ISBN 978-1-107-56156-4 Paperback

Additional resources for this publication at www.cambridge.edu.au/academic/technologies

#### Reproduction and communication for educational purposes

The Australian *Copyright Act* 1968 (the Act) allows a maximum of one chapter or 10% of the pages of this work, whichever is the greater, to be reproduced and/or communicated by any educational institution for its educational purposes provided that the educational institution (or the body that administers it) has given a remuneration notice to Copyright Agency Limited (CAL) under the Act.

For details of the CAL licence for educational institutions contact:

Copyright Agency Limited Level 11, 66 Goulburn Street Sydney NSW 2000 Telephone: (02) 9394 7600 Facsimile: (02) 9394 7601 E-mail: memberservices@copyright.com.au

Cambridge University Press has no responsibility for the persistence or accuracy of URLS for external or third-party internet websites referred to in this publication and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

All material identified by (ACARA, <year>) is material subject to copyright under the Copyright Act 1968 (Cth) and is owned by the Australia Curriculum, Assessment and Reporting Authority 2016.

For all Australian Curriculum material except elaborations: This is an extract from the Australian Curriculum.

**Elaborations**: This may be a modified extract from the Australian Curriculum and may include the work of other authors.

**Disclaimer**: ACARA neither endorses nor verifies the accuracy of the information provided and accepts no responsibility for incomplete or inaccurate information. In particular, ACARA does not endorse or verify that:

- The content descriptions are solely for a particular year and subject;
- All the content descriptions for that year and subject have been used; and
- The author's material aligns with the Australian Curriculum content descriptions for the relevant year and subject.

You can find the unaltered and most up to date version of this material at http://www .australiancurriculum.edu.au. This material is reproduced with the permission of ACARA.

Cambridge University Press 978-1-107-56156-4 — Technologies for Children Marilyn Fleer Frontmatter <u>More Information</u>

## Contents

Part 1: Researching 'What is Technology and Technologies Education'	1
Chapter 1: The contexts of technologies and technological knowledge	3
Introduction	3
The people behind the technology	5
Technacy	14
Technology transfer	18
Sustainable technologies	19
Technological knowledge	23
Teaching technology to children	31
Summary	32
References	32
Acknowledgements	34
Chapter 2: Key ideas in the technologies curriculum	35
Introduction	35
What is unique about technologies education?	36
Looking inside a classroom: making visible the content of the	
Australian Curriculum – Technologies in the teaching program	36
Generating designs	41
Case study: evaluating design briefs	42
Analysing design briefs	50
Looking inside an early childhood setting: engaging with the Early	Γ.
Years Learning Framework	56
Looking inside a classroom: investigating, making, evaluating	10
and designing paper planes	60
Summary	68
Keterences	69
Acknowledgements	70

vi

Cambridge University Press 978-1-107-56156-4 — Technologies for Children Marilyn Fleer Frontmatter <u>More Information</u>

Contents

Chapter 3: Designing and creating preferred futures	7
Introduction	7
Children conceptualising futures	7
Children's views of the future	7.
Drawing about the future	7
Looking inside an early childhood setting: planning for the future is about young children learning to plan	7
Looking inside a classroom: Year 1 and 2 children planning for designing and creating preferred futures	8
Looking inside a classroom: Year 6 children planning for designing and creating preferred futures	8
Summary	9
References	9
Acknowledgements	9
Chapter 4: Creativity in design	9
Introduction	9
Design and Technologies: imagination and creativity in design	9
Questioning the created environment	9
A framework for stimulating quality design questions	9
Case study: preschool, Foundation to Year 2	9
How do designers in the community work?	10
Creativity and imagination	10
Play as foundational for design thinking	11
Looking inside an early childhood centre: toddler play as creative design Looking inside a classroom: primary children's play as creative design –	11
architect's studio	11
Summary	11
References	11
Acknowledgements	12
Part 2: The Curriculum in Action	12
<b>Chapter 5:</b> The curriculum in action – digital technologies	12
Introduction	12
Digital technologies	12
Ethics and digital technologies	13
Computational thinking	13
Planning for teaching and learning in digital technologies	14
Looking inside an early childhood centre: toddler toys – infants,	
toddlers and preschoolers	14
Looking inside a classroom: Foundation to Year 2	14
Looking inside a classroom: Years 3 to 4	14
Looking inside a classroom: Years 5 and 6	15

Cambridge University Press 978-1-107-56156-4 — Technologies for Children Marilyn Fleer Frontmatter <u>More Information</u>

	Contents	vii
Summary	160	
References	161	
Acknowledgements	164	
<b>Chapter 6:</b> Technologies contexts – food and fibre production and food		
specialisations	165	
Introduction	165	
Approaches to technologies education	165	
Approaches to technological contexts – background information on		
fibre and fashion	167	
Looking inside a classroom: fibre production in Year 3	174	
Looking inside an early childhood setting: fibre production for infants,		
toddlers and preschoolers	176	
Approaches to technological contexts – background information on		
food specialisations	178	
Looking inside a classroom: food specialisations – a snapshot of		
Foundation to Year 2 children	181	
Looking inside a classroom: food specialisations – a snapshot of		
Year 3 and 4 children	181	
Looking inside a classroom: food specialisations – a spanshot of	101	
Voar 5 and 6 childron	183	
Summary	187	
Poforonces	107	
Admouladacemente	107	
Acknowledgements	100	
<b>Chapter 7:</b> Technologies contexts – engineering principles and systems,		
and materials and technologies specialisations	189	
Introduction	189	
Approaches to technologies education	190	
Pedagogical approaches for learning in technological		
contexts – engineering principles	192	
Looking inside a classroom: engineering principles and systems		
when looking at human movement	197	
Looking inside a classroom: engineering principles and systems	.,,	
for supporting bridge building	200	
Looking inside an early shildhood setting: ongineering principles	200	
and existence using blocks	204	
	204	
Defenseer	209	
References	209	
Acknowledgements	210	
<b>Chapter 8:</b> The curriculum in action – project management	211	
Introduction	211	
Community project approach in technology	212	
Looking inside an early childhood setting: project management	216	
	2.0	

viii

Cambridge University Press 978-1-107-56156-4 — Technologies for Children Marilyn Fleer Frontmatter <u>More Information</u>

Contents

Looking inside a classroom: project management	22
Progression in project management	22
Project managing – setting up a class newspaper	22
Project managing – setting up and curating an art gallery	22
Project managing mini enterprises	22
Engaging children holistically	23
Summary	23
References	23
Acknowledgements	23
Part 3: Pedagogical Practices for Technologies	23
Chapter 9: Planning, assessment and evaluation in technologies	23
Introduction	23
Finding out what children know	23
Setting up the learning environment	25
Designing spaces and interactions for assessment and planning	2
Organising learning environments to support creativity and	
imagination	20
Tinkering activities designed to enhance girls' technological	
capabilities	20
Summary	27
References	27
Acknowledgements	27
Chapter 10: Planning for teaching technologies – analysing the	
pedagogical approaches	27
Introduction	27
Designing for pedagogical diversity	27
Futures technologies	28
Summary	28
A final word	28
References	28
Acknowledgements	28
Index	29