

HIGHER EDUCATION AND SUSTAINABLE DEVELOPMENT

A model for curriculum renewal

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This text is an extract from 'Higher Education and Sustainable Development: A Model for Curriculum Renewal' (Earthscan/Routledge 2014). To purchase the entire book please visit www.routledge.com.

First edition published 2014
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

and by Routledge
711 Third Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

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British Library Cataloguing in Publication Data

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

Library of Congress Cataloging-in-Publication Data

Desha, Cheryl.

Higher education and sustainable development : a model for curriculum renewal / Cheryl Desha and Karlson Charlie Hargroves. – First edition.

pages cm

Includes bibliographical references and index.

1. Education, Higher. 2. Sustainable development. 3. Curriculum planning. 4. Curriculum change.

I. Hargroves, Karlson, 1974– II. Title.

LB2325.D435 2014

378–dc23

2013015806

ISBN13: 978–1–84407–859–2 (hbk)

ISBN13: 978–1–84407–860–8 (pbk)

ISBN13: 978–1–315–88395–3 (ebk)

Typeset in Bembo by
Keystroke, Station Road, Codsall, Wolverhampton

FOREWORD

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The Division of Basic and Engineering Sciences of UNESCO has collaborated with The Natural Edge Project since 2003 to produce a number of capacity-building materials for the engineering and science professions. These include *The Natural Advantage of Nations*,¹ *Engineering Sustainable Solutions Program*,² and *Whole System Design*.³ Further to supporting such important content development, I am very pleased to be associated with this new and timely publication, which explores how the higher education sector can play a part in the transition to sustainable development, by undertaking rapid curriculum renewal to embed such content within programs. As the United Nations (UN) draws attention to such issues during the International Decade of Education for Sustainable Development (2005–2014), the authors are to be congratulated on their proactive, collaborative and systemic approach to the important issue of curriculum renewal.

Sustainable engineering and technology are vital in addressing basic human needs and poverty reduction, to bridge the 'knowledge divide' and promote international dialogue and cooperation. Indeed, environmental sustainability is underlined as one of the eight Millennium Development Goals (MDGs), and the Intergovernmental Panel on Climate Change (IPCC) has emphasised the importance of technology in mitigating the impacts of climate change and helping society adapt to changes already locked into place.

Despite this significant need, there is a declining interest and enrolment of young people, especially young women, in engineering, which will have a serious impact on capacity in engineering, and our ability to address the challenges of sustainable social and economic development, poverty reduction and the other MDGs. Although science and engineering have changed the world, they are professionally conservative and slow to change. Rather than incremental change, a transformation of engineering and engineering education is essential if engineering is to play its vital role in assisting to reduce poverty, promote sustainable development and address climate change mitigation and adaptation. There are clear needs to show that science and engineering education and university courses are inherently interesting, and to promote science and engineering as a part of the solution, rather than part of the problem. To promote engineering and attract young people we need to emphasise these issues in teaching curricula and practice. Student interest is already evident, in activities such as the UNESCO–Daimler Mondialogo Engineering Award and work of Engineers Without Borders groups around the world.

In this context, this publication could not be more timely and relevant. While the need for curriculum renewal has been recognised for some time, there is still a need to share information on what this means in practice, and to share pedagogical approaches and curricula that can be mainstreamed for a whole-scale transition to education for sustainability. In this publication, the authors provide us with a practical guide on how such a transition might be strategically planned, within existing cultural and organisational contexts. They also include reference to a number of innovative examples of engineering departments who are responding to rapid changes in knowledge production and application, and changing government, industry and societal demands.

At a time when transformational change to sustainable development is critical, the authors have taken care to ensure that this publication is globally pertinent for a profession that will play a key role in the transition. In particular I commend the publication as a valuable and empowering resource to higher education colleagues in developing countries, who face serious constraints regarding human, financial and institutional resources to develop such curricula and learning/teaching methods.

Notes

- 1 Hargroves, K. and Smith, M. (2005) *The Natural Advantage of Nations: Business opportunities, innovation and governance in the 21st century*, The Natural Edge Project, Earthscan, London.
- 2 Smith, M., Hargroves, K., Desha, C. and Palouisis, N. (2007) *Engineering Sustainable Solutions Program: Critical literacies portfolio*, The Natural Edge Project, Australia.
- 3 Stasinopoulos, P., Smith, M., Hargroves, K. and Desha, C. (2008) *Whole System Design: An integrated approach to sustainable engineering*, Earthscan, London, and The Natural Edge Project, Australia.