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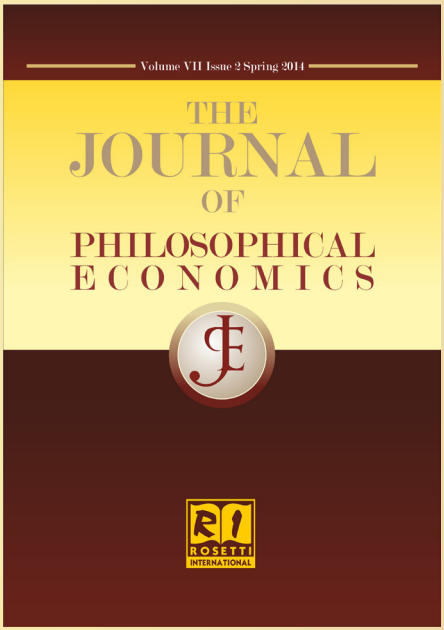

Review of Cheryle Desha and Karlso 'Charlie' Hargroves, Higher Education and Sustainable Development: A model for curriculum renewal, *London: Routledge, 2014, 268 pp., hb, $180.00, 9781844078592, pb, $49.95, ISBN 9781844078608*

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In 1992, almost 1600 of the world's leading scientists, including the majority of Nobel laureates in the sciences, warned that humanity and earth were on a collision course. They warned that environmental stress in the form of water resources, atmosphere, oceans, soils, forests, biodiversity and population growth represent a serious risk for humanity and other life forms on this planet.

More than 20 years later, the 2013 IPCC Fifth Assessment Report continues to reinforce this warning. Despite this mounting scientific evidence, it is still the exception rather than the rule for educational institutions to radically rethink how they will equip graduates for this new reality. In continuing to educate as if the future will be much the same as the past, we fail to hear Albert Einstein: that the significant problems we face cannot be solved with the same level of thinking that created them.

This book is for those interested in how to rapidly renew the curriculum of tertiary educational institutions for sustainable development. It is intended for those who can hear Einstein. Although specifically aimed at the engineering discipline, the authors' capacity building approach is relevant for other disciplines seeking to embrace sustainable development.

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The ten chapters of this book are divided into three parts. The first begins with a discussion of the environmental pressures driving the need to change from a 'business-as-usual' curriculum. Specifically, the authors outline how the pace of technological change has increased since the birth of the industrial revolution. The waves of industrial innovation, beginning with waterpower, then steam, electricity, the internal combustion engine and information technology, have been driven by the economic opportunity to reduce transaction costs. The emerging wave of industrial innovation such as renewable energy, biomimicry or radical resource efficiency, is being driven by the economic risk of failing to address the social and environmental costs of the previous waves of innovation.

Consequently, a business-as-usual approach to higher education is simply incongruous with the reality graduates will face. Yet, despite over 20 years' awareness of the need for this curriculum renewal, change has been slow. Deeply entrenched pedagogical, organisational and cultural factors have increased the need for not just renewal but rapid renewal. Desha and Hargroves put forward their Deliberate Dynamic Model of Curriculum Renewal to address this need. Their intention is for this model to act as a scaffold for efforts to embed sustainable knowledge and skills in curriculum renewal.

The second part of the book outlines the need for an underpinning strategic approach within which the model for renewal would reside; in particular, the pace and timing required for any renewal. Put another way, the strategic questions that will drive this model are, firstly, how far ahead of the pack do you wish to teach and, secondly, how quickly do you want to get there. Although not discussed by the authors, the asking and subsequent addressing of these questions is very much a function of the organisational culture and mindset.

The third part of the book focuses on execution, that is, how to undertake the five elements of the deliberate and dynamic model for renewal.

The first element calls for identifying the desired graduate attributes of any program. It seeks to overtly clarify what a program is trying to achieve in relation to education for sustainability. It asks what competencies, capabilities, knowledge, skills and qualities a program seeks to impart to its students. The authors adopt a whole of society approach by considering external influences such as industry needs, societal needs, regulatory needs, as well as internal influences such as staff and student needs.

The second element looks at mapping the potential learning pathways for the desired attributes. For every graduate attribute that has been selected, there will be component skills that need to be embedded into student learning across courses and years of study; that is, to map out how and where the attribute will be generated across the years of study. For example, an attribute such as understanding the environmental, social and economic interrelationship may be broken down into sub-elements that could be covered across the various years of study.

The third element discusses the need to audit learning outcomes. A poignant area to which the authors give focus is the need to identify what is actually covered in a curriculum as opposed to what should be covered or what is perceived as being covered. The authors then outline a process for auditing desired sustainability outcomes.

The fourth element outlines a menu rather than prescriptive approach to how a faculty could develop and update the curriculum in order to deliver the intended outcomes. The need for such an approach is based on the authors' claim that, in higher education, embedding learning outcomes is the exception rather than the rule, therefore requiring greater support and strategic direction subject to the norms of any given institution.

The final element focuses on the issues associated with implementation of any new program. It emphasises a whole-of-system approach to implementation rather than independent, piecemeal activities by various departments.

In this book, Desha and Hargroves have developed a coherent, action-orientated model for curriculum development. This approach is grounded in concepts that have been developed over many decades and is coupled with applications from the real world. They propose a strongly rational, objective, knowledge-based approach to a problem that will appeal both to the engineering discipline and beyond.

The problematic aspect of this book is that the education sector has failed to comprehend Einstein's advice. For more than 20 years, our rational, objective, knowledge-based approach has identified the need for curriculum renewal; yet, as acknowledged by the authors, curriculum development has been slow if at all. This has resulted in strategic drift and, in turn, the need for not just renewal but rapid renewal. This book will be most helpful for those individuals who are in institutions that are already aware of the need for change and are motivated to change, to take action, to move beyond the rhetoric to the behaviour. However, if one is dealing with

an institution whose level of thinking has not changed significantly in 20 years, and continues to cling to outdated mental models, or to obfuscate the need for strategic renewal, then the teachings of this book should be complemented with the teachings of Machiavelli.

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