Introduction

Reshaping environments – an opportunity for envisioning the future

Helena Bender

Humans reshape the environment by building, growing, digging up and moulding. But while we help create our environment, we are equally one of its creations. Humans and other living things have evolved genetically in response to environmental opportunities and restrictions. We have built physical structures and developed cultures and social institutions to respond to our biological needs and to enrich our experience of living as part of our environment. Climates influence architecture, weather alters moods, and views of buildings result in slower rates of recovery after surgery than a view of a tree (Sternberg 2009). The act of reshaping is an opportunity to envision the future, and to identify and understand the connections between humans and the world we inhabit and constantly shape. We see this text as a tool to engage with this opportunity.

While shaping and then reshaping of environments is often associated with degradation, damage and sometimes crises, it can also be associated with revegetation, rehabilitation and improvement. How we view an issue or situation can illuminate different pathways and choices. How we view our own role in effecting change can similarly result in different options emerging or pathways being created. In this book we acknowledge that there are multiple responses to situations, depending on resources and world views as well as the unique variables of each context. The important thing is to be conscious that each of us always has some choices to make. We choose our pathways through both action and inaction, as well as through the ethical stance that we take. The choices we each make are part of shaping the future. As we reshape our choices, behaviours and interactions, we reshape our future. Phillip Adams (1992), an Australian broadcaster, once said: 'The paths to the future are made, not found.' It is this sense of purpose that we celebrate in the development of this textbook. We hope it will inspire and guide you in forging your own paths to the future.

Reshaping Environments: An interdisciplinary approach to sustainability in a complex world acknowledges that today's humans are not the first shapers of the environment or world, but one group of many that are likely to be followed by future shapers. The textbook aims to engage the readers of this text in thinking about the 'doing'

associated with shaping and reshaping ideas and practices. This is done through the prompting questions that can be seen in the chapters on interdisciplinary practice and critical thinking, for example, as well as the transparency of purpose and practice stated by the authors of the case studies. It is important to lay bare the methods and the different bodies of knowledge used by the different disciplines for finding solutions to human–environment issues so that others may draw upon and apply these approaches elsewhere. Identifying the processes and actors, the scale at which they act and the systems involved will assist planners, designers, engineers, architects, decision-makers and environmental scientists to clearly envision the relationships involved in any issue, the possible pathways forward and their potential consequences.

An interdisciplinary and transparent approach

This text attempts to demonstrate an interdisciplinary approach in exploring human relationships with reshaping environments. Instead of compartmentalising issues into their component elements (Bacon 1875), an interdisciplinary approach explores the relationships and interconnections that are relevant for addressing an issue. Rather than using only single disciplinary approaches, an interdisciplinary approach weaves together the skills and knowledge developed by single disciplines. In striving to find solutions, it builds on the norms of our academic silos, for example decentring science and economics as superior analytical tools and repositioning them as part of a palette of analytical processes and skills (Ravetz 2005). Acting within such an approach requires a willingness to respond to complexity.

Each author in this book is an active researcher that has been trained in one or more disciplinary backgrounds. Many of the authors share the descriptor 'environmental' – as in environmental engineer and environmental psychologist. However, the discipline training that each author brings is deeply embedded in the way they formulate questions for research and in the way they open and use the 'tools' in their discipline 'toolbox'. In writing the chapters each author has circulated their chapter amongst the other authors, and then worked to incorporate their multiple views and comments. This method of creating a textbook or shared writing, sometimes called the Open University method (Pryke, Rose and Whatmore 2003), might have resulted in little more than multiple disciplines being presented alongside each other. However, this text has gone further and the authors are striving to 'walk the talk' around interdisciplinarity.

All of the authors in this textbook have contributed in some way to the delivery of a subject entitled 'Reshaping Environments'. It is a core subject in the Bachelor of Environments, the only interdisciplinary degree offered at the University of Melbourne, Australia. However, it was not until the second year of teaching the subject together that an understanding of what it is to create an interdisciplinary domain began to be formulated.

A significant realisation that came from discovering this interdisciplinary domain is that the process of thinking how to achieve change, and that acknowledges the realities of human–environment issues, needs to be made as transparent as possible. The emphasis shifts from trying to include a lot of ideas about carbon sequestering, waste recycling and myriad other things associated with improving and creating a more sustainable world, to emphasising how to create a space for the discussion of change. This has become known amongst the teaching team of the 'Reshaping Environments' subject as the three i's: 'interrupting' the dominant paradigm or associations, creating the space to ask or 'interrogate' with new questions, and listening to multiple voices with a goal of seeking to 'integrate' the diverse responses (Beilin and Bender 2010). This approach informs this text.

By making motivations clear in this text we reveal the mechanics of engaging with issues. For example, Kath Williams describes the tools used to determine people's views of different forestry practices and the reason for selecting these tools, in the case study in the first part of the book. This provides the reader space to make his or her own decisions and choices when considering the complexities of human–environment issues, while also being able to observe the choices each of the authors has made. Through observation and independent decision-making, readers can recognise the uncertainties involved in collecting and evaluating data, and accept or reject the underlying assumptions or the subsequent conclusions. When motivations are hidden, it is easier to be misled. The process of conscientisation – building critical thinking through reflective processes (Freire 1972) – is critical. Through reflection the 'conscientised' is assisted to identify what is important to him or her, and this leads to empowerment, a pre-condition for action, critical awareness and adaptation. Because this textbook recognises that each new reader brings a distinctive view and voice to the interpretation of what is written, readers are encouraged to engage with the theory and case studies to add their expertise and ways of doing and seeing to the process.

Acknowledging a range of perspectives is not the same as relativism. While an interdisciplinary approach welcomes diverse viewpoints, it is with a view towards making wise decisions, and this requires a preparedness to seek agreement about values and goals. But environmental issues, especially those that involve human interactions, are fraught with uncertainties, and rarely have a single simple solution, meaning we often need to make decisions without clearly understanding the consequences of those decisions, or the likelihood of the outcomes if we do not act. By accepting that there are multiple perspectives, and acknowledging the risks that come with unknown outcomes, we can strive for more realistic responses in environmental decision-making, and devise wise strategies that allow us to move forward rather than be frozen by lack of knowledge. Denying uncertainties ignores the complexities in the system and makes us blind to opportunities that may come from emergent events. We must learn to embrace uncertainty and plan for the flexibility to adapt when the unexpected occurs.

Uncertainty is an inherent characteristic of a 'wicked' problem (Rittel and Webber 1973) or issue, because defining the issue is so difficult – wicked issues often involve interacting open systems, where the cause of the issue is often uncertain, and there are many stakeholders who view the issue differently, each preferring a different set of boundaries and evaluation criteria. There are no classes of wicked problems and no set solutions that can be applied. Each wicked issue is unique. Any response taken to the wicked issue will not be right or wrong, because it will not address all outcomes or consequences, and therefore the action selected will be either 'better or worse'. Wicked issues have no simple solutions, and Rittel and Webber (1973) suggest that, in fact, with wicked issues you cannot tell whether 'the' or 'a' solution has been found, and that there are significant waves of consequences from whichever action is taken that will resonate through all the stakeholders, over all temporal scales. Instead they suggest that the aim should be for resolutions for the moment, based on judgment, with recognition that 'every attempt to reverse a decision or correct for the undesired consequences poses another set of wicked problems' (Rittel and Webber 1973, p. 163). It is important to realise that wicked issues do not stem from a search for the truth, but from a desire to improve some characteristics of the world where people live. This is the interface of human–environment interactions, and the zone in which people seeking to plan, manage or care for the future work. The case studies presented in this chapter are examples of the authors engaging with wicked issues. The theory chapters describe some of the tools they bring to bear in their efforts to expose and work through the challenge before them.

Structure of the book

This book has three main parts. Part One is made up of a series of international and Australian case studies that focus on human–environment interactions. The case studies appear first in this book to disrupt the notion that the first step in a pedagogical process is to provide the background, theory or basic knowledge that will be needed to understand and solve more complex issues. By starting this book with the issues and compelling questions, we aim to encourage readers to seek the theoretical explanations and conceptual tools that can be used to understand and offer solutions for the issues posed.

The case studies have been ordered to further facilitate readers and educators in exploring the underlying theory. The sequence of the case studies matches the sequence of the theory chapters. For example, the second case study, 'Reshaping land transport in Singapore: a policy perspective', can be paired with the second theory chapter, 'Sustainability – a model for the future'. This is not to say that this is the only way that the case studies and theory chapters could be paired or ordered, as each case study utilises multiple theoretical concepts. For example, alternative orderings that could be considered for the case studies would be scale, systems or some other focus. The 'Burning questions: researching the meaning of fire in the Australian landscape'

case study has been purposefully placed last in Part 1 because it explores the process of asking research questions and so acts as a transition between the case studies and the skill and theory sections that follow.

Part 2 is a collection of guidelines to the key skills needed to address complex environmental issues. It includes critical thinking and reading, reflective thinking and writing, some key strategies for working in project teams and approaches to evaluating research methodologies that come from multiple disciplines. Also included here is a chapter on taking an interdisciplinary approach, and the sorts of questions that are needed for wise decision-making.

Part 3 is an introduction to the principles, theoretical concepts and analysis tools that the authors believe are critical to approaching human–environment issues of a complex nature. This part commences with complexity, the broadest theoretical concept covered, to provide a framework for engaging with the complex issues and case studies discussed. We then delve into the theoretical understanding of sustainability, a guiding but perhaps blurry light that leads us to find ways of resolving the complex human–environment issues we face. The text then offers a collection of processes and tools that facilitate analysis and approaches to resolving complex issues – a chapter on human needs, norms and wants, then a chapter on systems, followed by a chapter on scale. Most of the theory chapters talk about systems, but the chapter on this topic does not appear until almost the very end of the book. This is deliberate. The concept of systems can be used and applied in many contexts. By exposing the reader to this concept in both applied and theoretical contexts, we aim to compel the reader to seek out a deeper understanding of the concept, while also reinforcing readers' understanding through repetition.

All parts include questions for readers to answer, like a workbook. The aim is to prompt deeper consideration of the theoretical ideas and also investigate how these concepts may be applied to real examples. We aim to strengthen readers' analysis, critiquing and evaluation skills.

Each case study has a similar structure: an introduction, guiding questions for the case, additional information about the case methodology such as the analysis tools used and the findings, as well as a reflection by the author. As different case studies have different emphases and use a different consortium of the theoretical tools from Part 3 of the text, a structural element has been included at the end of each case study that summarises the theoretical concepts covered in that case. For example, the first case study – 'Costa Rica's dry north-west' – briefly discusses how sustainability, complex systems, and scale were applied in the chapter. Readers can therefore start with any case study and progress to several theory chapters.

Function of each part of the book

Part 1 is the 'walking the talk' part and provides examples of complex human–environmental issues where change, action and the search for knowledge is

modelled. Each case study draws upon some of the theoretical components covered in Part 3. For example, the sustainable schools case study looks at sustainability in the context of learning, building design and construction, as well as using aspects of scale and systems analysis. The case studies also utilise, to a varying extent, the skills described in Part 2 with different research methods like interviews, photo elicitation, and surveys used. Consequently these case studies serve as examples of applying theory and skills to address environmental issues and can be analysed for their approach.

The case studies presented cover a variety of human–environment interactions. The first four case studies focus on human–environment interactions on the land: the impacts of land use change (Chapter 1 – clearing of forests in Costa Rica), how political perspectives can influence transport choices (Chapter 2 – transport planning in Singapore), the conflicting visions that exist around managing forested landscapes (Chapter 3 – forest management in Tasmania, Australia), and the shifting roles that government and private owners can play in caring for regional landscapes (Chapter 4 – the role of Landcare in south-east Australia). Two case studies consider human–environment interactions in relation to water – Chapter 5 evaluates how best to manage water for good health in PNG, while Chapter 7 reflects on what is a better policy approach for managing a river basin. Chapter 6 considers the interactions between humans and building spaces, with consideration of what makes good sustainable design, while Chapter 8 explores the historical context for how fire is managed in Australia.

Part 2 of the book provides a collection of skills needed by all to engage actively and deeply in the events happening around them. It is essential that we look with a critical eye at the information presented to us and that we consider how it relates to what has come before. We recognise that reflection on the connections and relationships between ourselves and the people, stories and information we encounter, as well as how our actions can effect change, make us more engaged citizens. Writing about these reflections helps to solidify and formulate our views and to see how our views might change over time. Relationships can involve more than one person, and environmental issues often involve many stakeholders. Working with groups of people to respond to issues requires a collection of skills that need developing and nurturing. This part identifies these skills and makes suggestions on how to approach some of the challenges associated with working in teams.

Part 3 serves to ground readers in the definitions and concepts needed for addressing complex issues. It lays bare the key aspects of terms like sustainability, complexity, needs and norms so that each concept may be identified in the case studies and analysed thoroughly and deeply. It demonstrates the importance of concepts like interdisciplinarity and scale and systems analysis, exposing the process involved in finding solutions to human–environment issues so that the practice of applying these tools in the case studies can be evaluated and critiqued. It suggests that these concepts

are useful qualitative 'tools' in the toolbox of the 21st century citizen. It also models an approach to dealing with contentious concepts that uses academic writing techniques such as defining contentious terms, analysis, comparison and evaluation.

Who is this text for?

The readers of *Reshaping Environments: An interdisciplinary approach to sustainability in a complex world* are the Earth-changers of today and tomorrow. They are the environmental practitioners on whom the Earth depends and it is not too soon for them to 'tool up' for the way ahead. We need the reader, whether student or instructor, to know they can make the Earth a more sustainable place for all.

Role of the book for students

If you are a student, it is appropriate to think of this book as a reference guide: a book that you return to when you want to clarify a concept, find an example, or find out how to do something. It is not essential that you read the chapters in order, or that you read every case study in the book, although we recommend that you read each case study from the beginning so the background to the issues is understood. We encourage you to read all the theory chapters in Part 3 as they are the building blocks, processes and tools that we believe will assist you in thinking about issues in the environment, whether evaluating, designing, planning or managing.

We hope that you will find this book a provocative introduction to a number of issues that you are familiar with, and others you may not have considered before. The issues we discuss are related to everyday life and professional practice, and require you to have certain basic skills, including the habit of rigorously assessing your thinking, applying critical thinking skills, and reflecting on your learning and views. In Part 2, the processes of thinking critically and reflectively are described. It is important to recognise that critical thinking requires practice, dedication, time and an open mind, and we encourage you to read this section carefully before you begin analysing the case studies.

The textbook gives students examples for each of the methodologies and techniques we introduce. The case study on managing forested landscapes in Tasmania is an example of engaging with complexity by using scale and interdisciplinary analyses to offer a range of solutions. We showcase a range of approaches through practical case studies that span a range of scales from very local urban change (like the case study on sustainable schools (Hes)) to regional (change in Guanacaste, Costa Rica (McLennan)). We offer the case study on sustainable schools as an example of using systems thinking and 'post-normal' science to choose a path to the future.

Students are supported in engaging with the ideas of this text in a number of ways: questions and modelling different disciplines' research methods, as well

as academic writing techniques such as defining contentious terms, analysis, comparison, and evaluation.

Questions

Questions are provided within the conceptual, skills and case study chapters to enhance understanding and extend the application of the ideas explored in the chapter to a wider context. Each chapter may approach an issue or idea from alternative discipline perspectives in order to expose the value of multiple viewpoints and, we hope, challenge you to think about your philosophical world view, where it has come from and why you hold it. The questions also demonstrate and model the range of different types of questions, such as open and closed, that you may use to extend your own discussions.

Modelling research methods

In each case study the methodology used by the author for collecting and analysing both qualitative and quantitative data is described. The authors have been explicit about their decision processes and reasoning in selecting different methods to collect data, as well as why they have included or excluded data from their analyses. Making these decision processes transparent will support you in making similar decisions when conducting your own research.

Academic writing techniques

As you read the chapters and case studies you may find that some terms are used differently across chapters. It is important to recognise that this has been done purposefully as it reflects the breadth of understanding and disciplines that have been brought together for writing this text, as well as the contentious nature of some of the terms that are relevant to human–environment issues. Where the authors differ in their use of terms they have explicitly defined them. Defining and critiquing terms that have different meanings, or are contentious, is a key strategy used by academics. Other key strategies used by academics include analysis, comparison and evaluation. These techniques have been applied throughout this text, and some guidelines for how to apply some of these techniques are provided in Part 2. We encourage you to read these chapters, then, not only for their content, concepts and implications, but also for the way the authors have defined and critiqued key terms, as well as the way they have constructed their arguments.

Student perspectives

Below you will find the thoughts of two students of the subject 'Reshaping Environments' about their experiences of this interdisciplinary subject and the concepts covered. We hope their comments will assist you to know that you are not alone if you are feeling perplexed or challenged, and that persistence will help you find a path through the process of interdisciplinarity and change-making.

Dorothy Meng (2010)

'Reshaping Environments' places a lot of emphasis on using integrated thinking, and initially it was sometimes hard to figure out why (apologies to the Reshaping staff). Especially as it is quite an abstract idea, when compared to the usual way we are taught in high school to solve problems through the scientific method. That is: here is the problem, isolate the broken element, and fix said broken element. This, of course, has its uses, but it can also be limiting, because it is so problem and solution driven. It is, in other words, a really linear way to look at the world or, in Reshaping's case, the environment. And the environment can hardly be described as a linear place to be. It is dynamic because not only are the elements dynamic but causing a change to any single element would have effects on other surrounding elements because of their complex relationships. This is a big idea I found quite difficult to grasp initially. Until I figured out the usefulness of integrated thinking. Integrated thinking takes different styles of thinking, or 'looking at the world' if you will, and mushes them altogether so you can gain an overall sense, or 'the bigger picture'.

This is also the reason why 'Reshaping Environments' teaches you so many different styles of thinking or 'looking at the problem' throughout the course. It is why gaining an understanding of scale, interdisciplinary and systems thinking is important to understand within the course, because what they are really giving you is a different way to look at the same thing.

So here is a quick 101, which I thought helped me with the different styles of thinking, and I hope you find them useful.

Scale: I found the best way to approach this was to think about different eye-levels. At a small scale, I would imagine that I was an ant and at a big scale I would imagine I was an elephant and I would try to imagine what I would see at their eye-levels.

Interdisciplinary thinking: important because it helps you understand each individual element in detail (sometimes at different scales). Interdisciplinary is really about looking at the object from different angles or different points of view as an engineer, ecologist or perhaps just as yourself.

And last, but not least.

Systems: takes the elements within the systems and tries to identify the relationships between these elements. This style of thinking can get complicated as you begin to identify the numerous relationships between elements, and really begin to see how interconnected elements often are in the environment.

Incorporating all the different views these styles of thinking gives you about the environment is what integrated thinking is. And, if you think about it, we use integrated thinking unconsciously all the time, 'thinking with our senses': our touch, sight, smell … And unconsciously our brain will piece these senses together to give us an informed view of our environment. The really difficult part will be consciously

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Dorothy Meng continued ›

piecing together all the information we've gained from these 'new senses' through scale, interdisciplinary and systems thinking, to gain an informed understanding of the bigger picture.

Celeste Orange (2010)

This is a story about a glass jar.

We are only a few weeks into the semester and the class walks into the tutorial room. A hush falls over the students as our tutor begins to write up this week's discussion on the board. Our tutor addresses the class with a question about last week's lecture. She then sits, unzips her bag and awaits our answer. At this point in the term, everyone is still a little wary of one another and are finding their feet. Silently we consider her enquiry; nobody is brave enough to speak up. Slowly she pulls a glass jar of water out of her bag and puts it on her desk. She is still waiting for our response. The glass jar is unscrewed, tipped towards her mouth and a sip is taken. I look around the room, trying to catch someone else's eye. Did anyone see that? A glass jar used as a drink bottle? I am utterly perplexed. It is almost like watching someone eat a Mars Bar with a knife and fork. Sure – they belong in the kitchen, but the context in which they are being used is wrong. I glance to my Pump bottle on the desk, look back to the jar and then revert my gaze to my bottle again. A hundred questions race around my head. Did she leave her bottle at home? Why didn't she just buy a bottle of water from the vending machine downstairs? What kind of product called that jar home before it became a water bottle – jam or pickles? I leave the class confused. I can't believe how hung up I am about this stupid jar. But why, why, is she drinking from a glass jar?

As you can imagine, the rest of the semester I am waiting for her to pull this impostor drinking apparatus out of her bag again to prove it wasn't a figment of my imagination. Don't get me wrong – I did spend a lot of time in class not thinking about the jar, but I would be lying if I told you it didn't stay on my peripheral consciousness. The weeks slide away and no jar appears. In our tutorials, readings and lectures, we are challenged to think about what the concept 'Sustainability' actually means. What are we sustaining? Who are we sustaining for? We are openly dared to point out what hurdles today's society is facing to meet the basic universal needs that all human beings require and also hypothesise about what our current generation might do in the future to reshape current norms into more sustainable practices. Gradually I can feel a shift in the class's perception of the gravity that surrounds the issue of norms shaping the way we satisfy our needs. I am as quick as everyone else to get on my soapbox and criticise other people's unsustainable behaviour and methods used to meet their needs. I feel slightly malicious 'tsk tsk-ing' those who have gotten it so wrong in the past, but I won't deny that it isn't a most agreeable activity.