
Reviews

A framework for geodesign: changing geography by design by C Steinitz; ESRI Press, Redlands, CA, 2012, 224 pages, \$79.95 paper (£66.50), ISBN 9871589483330

People have designed and changed the geography of their landscapes for thousands of years, for the better or for the worse. But with more pressure being placed on the world's resources, with increasing numbers of people, the question that we are now faced with is: what are the best sustainable design solutions to mitigate these challenges? For example, urban growth is inevitable given the increasing concentration of people living within cities, and as a trend this is expected to continue into the foreseeable future. The question that designers and planners are therefore faced with is what scenarios would lead to, say, the least amount of loss in biodiversity. But this is a multifaceted problem ranging in scale from how do people build their homes, to where should new industry be located, or how should land be conserved? These are all questions involving spatial decision making, and where geographic information systems (GIS) can play an important role. Over the last forty years GIS have increasingly been used to assist in such complex decisions, from modelling urban growth projections through to assessing the spread of pollution [see Longley et al (2010) for an extensive list of applications]. However, one of the original visions for GIS, which is often overlooked, is that of a tool for design (Goodchild, 2010).

In his book *A Framework for Geodesign: Changing Geography by Design* Carl Steinitz brings his vast experience as a landscape architect and planner to such an issue. For those not familiar with the term geodesign, Steinitz writes in his preface to the book that it “is an invented word, and a very useful term to describe an activity that is not the territory of any single design profession, geographic science or information technology” (page ix). More generally, Steinitz frames geodesign as “the development and application of design-related processes intended to change the geographical study areas in which they are applied and realised” (page 1). Or another way of putting it: the merging of geography and design through computers. This is reiterated later on in a quote from Michael Flaxman where he states “Geodesign is a design and planning method which tightly couples the creation of design proposals with impact simulations informed by geographic contexts, systems thinking, and digital technology” (quoted on page 12).

Moreover, geodesign can be considered both as a *verb* and as a *noun* which Steinitz (1995) relates to design more generally. In the sense as a verb, geodesign is about asking questions and as a noun, geodesign is the content of the answers. In this book Steinitz not only clears up the meaning of geodesign but more importantly provides a comprehensive framework (based on his past work) for thinking about strategies of geodesign, and for organising and operationalising these meanings.

The book is made up of twelve chapters and split into four parts. The first part is spent on framing geodesign and sets the scene for the remainder of book. For example, chapter 1 notes that, for geodesign to be successful, one requires collaboration between the design professions (eg, architects, planners, and urban designers), geographical sciences (eg, geographers and ecologists), information technologies, and those people living within the communities where geodesign is being applied. This is reiterated throughout the book. Chapter 1 also traces the history of geodesign, and how the advent of computer methods for the acquisition, management, and display of digital data can be used to link many participants, thus making design not a solitary activity. Chapter 2 introduces the reader to the context for geodesign in the sense that (1) *geography matters* and that different societies think differently about their geography; (2) *scale matters* in the sense of what scale should a geodesign project be applied at (eg, local, regional, or global), and what are the appropriate considerations that need to be incorporated at each scale; and, finally, (3) *size matters*—if the size of the geographic study area increases, there is a high risk of a harmful impact if one makes a mistake.

Part 2 of the book lays out a framework for geodesign. It is important to note that Steinitz does not call this a methodology for geodesign, as he argues one cannot have a singular methodology as the approaches, principles, and methods are applied to projects across a range of *geographies*, *scales*, and *sizes*. He therefore introduces a framework as a verb, specifically for asking questions, choosing

among many methods, and seeking possible answers. In order to develop this framework Steinitz walks the reader through six different questions and types of models common in geodesign projects.

Chapter 3 focuses on components of the framework and the questions one needs to address for a successful geodesign project. These questions are broadly: (1) How should the study area be described? (2) How does the study area operate? (3) Is the current study area working well? (4) How might the study area be altered? (5) What differences might the changes cause? (6) How should the study area be changed? As posed by Steinitz, these questions are not a linear progression, but have several iterative loops and feedbacks both with the geodesign team and the application stakeholders. Moreover, Steinitz argues that such questions should be asked three times during the geodesign study. The first time they are treated as *why* questions (eg, to understand the geographic study area and the scope of the study). Secondly, the questions are asked in reverse order to identify the *how* questions (eg, to define the methods of the study; therefore geodesign becomes a decision-driven rather than a data-driven process). Finally, the questions are asked in sequential order to address the *what*, *where*, and *when* questions as the geodesign study is being implemented. Once these three iterations are complete, there can be three possible decisions: yes, no, and maybe. If maybe or no, more feedback is needed between the geodesign team and the stakeholders. These iterations highlight how geodesign is an ongoing process of changing geography by design.

Using this framework, chapter 4 discusses the first iteration of questions: that of scoping the geodesign study. The emphasis of this iteration is ensuring that it is being decision driven as opposed to data driven. Moreover, it goes over the six questions in an attempt to identify the intended scope for the study before looking at a feasible methodological plan. Chapter 5 moves onto the second iteration: that of designing the study methodology. Having identified the scope of the study (the why) from the first iteration, the geodesign team must then explore how it will be carried out and what are the evaluation criteria. Chapter 6 discusses the third iteration: that of carrying out the geodesign study (the what, where, and when questions). Throughout these chapters Steinitz reiterates the need for stakeholder input and feedback from the geodesign team. Moreover, at the end of chapter 6 Steinitz reiterates that the choices matter. The why questions provide a sense of the scope and objectives of the design application: the problem, the study area, and those scales required for operationalising a successful project.

Part 3 of the book looks at nine case studies in geodesign from around the world. Ranging in temporal scale from days to years, from no financial budget to a large budget, and from a small to large numbers of participants, these case studies helped solidify many of the concepts identified in the preceding chapters. They range from urban growth, to urban change, to that of fire management. The case studies focus on specific places and utilise GIS with a variety of different techniques, from anticipatory modelling to that of participatory modelling and rule-based models (eg, cellular automata). They also show the importance of visualisation: as Steinitz notes, “spatial visualisation can significantly influence decision making” (page 168). These examples have details but not depth (however, references are given to the full case-study report), but this reiterates the purpose of the book, in the sense it is not a ‘how to’ textbook or a listing of technologies that enable geodesign. It is a discussion with examples of geodesign. Or to quote from the last page of the book “you cannot copy an example but you can gain experience by joining the collaborative activities of geodesign and changing geography by design” (page 201). The same goes for the applications: they give a valuable insight into what is possible with geodesign. The book concludes by discussing the future applications for geodesign, which range from looking at the implications for research in geodesign to sketching out a geodesign support system (see Ervin, 2011); and, in a sense, one could relate this to other planning support systems (see Brail, 2008), but with a greater emphasis on design.

Overall, the book is extremely well written and Steinitz provides a critical and personal account of geodesign, which shows his expertise in the area from his years of teaching and carrying out geodesign work. The use of figures and real-world examples really helps support the discussion. But if you are looking for a textbook for ‘how to’ do geodesign, or a list of technologies that enable geodesign, you need to look elsewhere. This is a book about the principles and practice of geodesign in a general sense, which provides a valuable resource for those interested in this topic.

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Cognitive and linguistic aspects of geographic space: new perspectives on geographic information research edited by M Raubal, D M Mark, A U Frank; Springer, Heidelberg, 2013, 300 pages, €106.95 (\$129.00, £90.00), ISBN 978 3 642 34358 2

This book contains chapters based on presentations at the meeting "Las Navas 2010: Cognitive and Linguistic Aspects of Geographic Space", held 4–8 July at Las Navas del Marques in Avila Province, Spain (in a charming 'half castle, half palace'). The meeting was a follow-up to the longer meeting held on this theme at the same location in July 1990. The original meeting must have been something stimulating to attend (two weeks with Pylyshyn, Lakoff, and Cloud!), and it was definitely seminal for, among other reasons, spawning the biennial conference series COSIT, the "Conference On Spatial Information Theory" and, a few years later, the journal *Spatial Cognition and Computation* (both going strong to this day). The presentations at the 1990 meeting were the basis for an important book (Mark and Frank, 1991) with the same main title as this 2013 book. Several (but not all) authors are the same for both books. I believe the 2013 book is better, however, and I think it is better because so much new thought and new research have been done, and because so many prominent scholars in this field have learned so much (including about ideas and research already existing by 1990). Many of these scholars and their students have become the interdisciplinary (transdisciplinary?) creatures one could foresee emerging from the insights and interactions of the original meeting.

The present book clearly demonstrates that there is an interesting and coherent area of study known as geographic information science (GIScience) that is quite distinct from GISystems, and that includes the study of geographic cognition and language as one of its core undertakings. To be more precise, the book is about cognitive GIScience and GISudies, nowhere demonstrated more clearly in this book than in the final chapter—the most singular—that presents a qualitative analyses of acoustic space for artistic performance, demonstrated at the 2010 meeting by a partial rendition of the journey of Homer's Odysseus through spatialized sound (cool). Chapter 1 is the editors' informative overview, but most of the chapters successfully overview research concepts and accomplishments of the past twenty years and point to future research directions within the cognitive domain of GIScience. Frankly, when I sat down to consume this book, I was expecting more of an uncoordinated buffet than a harmonious prix fixe meal, but I was pleasantly surprised at how well most of the chapters go together stylistically and thematically, making the book more than the sum of its parts, like any fine meal, and unlike many edited collections.

The theme of this book and of this research community is nicely expressed by Kuhn in one of the book's strongest chapters as "an ontological undertaking: to formally define the meaning of qualitative terms in order to enable automated reasoning on them" (page 160). One could summarize this research field and this book's theme in terms of the "COSIT triangle", with vertices of (1) earth and environmental disciplines like geography, geology, and planning; (2) behavioral and cognitive science disciplines like psychology, anthropology, and linguistics; and (3) computational/informational disciplines like computer science, mathematics, and information science.

Yet a third way to understand the content of this book is to consider a fairly small and profound set of major research questions, each dealt with in multiple chapters:

- (1) How can we formalize human conceptions and reasoning about geographic phenomena, so we can implement them in information systems, both to make the systems work better for human users and to replace some of the tasks of human users?
- (2) What is the proper way to understand the relative roles of spatial, temporal, and thematic properties in studying geographic cognition and information, and how should they be understood to interrelate?