

Agent-based modelling for archaeology. Simulating the complexity of society. By Iza Romanowska, Colin D. Wren, Stefani A. Crabtree. Santa Fe, The Santa Fe Institute Press. xiii + 429 pp. ISBN (paperback): 978-1-947864-25-2.

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Agent-based modelling, or ABM for short, is a popular computational simulation technique widely used by several disciplines. By contrast, despite its long-term use and recent growing interest, it remains niche in archaeology. Two main reasons explain this state of affairs. Firstly, a relatively widely shared incomprehension – and thus reluctance – by many archaeologists about what modelling and simulation entail. Secondly, a general difficulty in assessing a technique whose main medium is computer code, with all this implies, rather than more familiar and immediate written expressions. This textbook co-authored by Romanowska, Wren and Crabtree aims at breaking this second barrier by introducing archaeologists to coding in ABM through one of its main platforms, NetLogo. In this sense, the primary audience of this book is assuredly not archaeologists seeking an introduction to what ABM is and does, though the volume does contain a few things about this, but rather archaeologists who are already convinced about its potential for archaeological research and reasoning.

The organisation of the book in three sections aptly named “Learning to walk”, “Learning to run”, and “Learning to fly” leaves no doubt about its pedagogic ambition and contents. Each chapter combines, often in unequal quality, general introductory sections and comments with, systematically stronger, a majority of pages dedicated to code. These take the form of practical and effective tutorials exploring an array of models linked by common themes including mobility (e.g. dispersal and population dynamics), economics (e.g. trade and exchange), subsistence practices, and, to less extent, cultural transmission. There is no doubt that the first two sections, with their focus on walking through NetLogo interface and code snippets, constitute the strongest part of this book. In addition, all models explored here are also freely available in a dedicated online repository (<https://github.com/SantaFeInstitute/ABMA>), true to the core values of replicable and open science which are, it must be applauded, dutifully followed. To convey the technical content of their teaching, the authors adopt a friendly tone addressing directly the reader. Although this is arguably a matter of personal taste, it must be said that, whilst largely effective, this editorial decision occasionally borders on the patronising (the unfortunate, and frankly unnecessary, section on how to create a scatter plot in Excel being the most noticeable example). In a related way, the book makes extensive but inconsistent use of annotations in the margins. Sometimes these are used for required formal definitions and pointers to technical issues; sometimes for more light-hearted distracting comments which do not add much to the general content.

As said, Part I, aside from the introduction, and Part II constitute the highlight of the book, with their emphasis on teaching code. By contrast, both the introduction and Part III (“Learning to fly”, on the interface between ABM, GIS, network analysis and data science) are noticeably weaker in practical and conceptual terms. Admittedly, the authors stress that the book does not intend at offering a fully-fledged introduction to ABM in archaeology. Yet, the introduction and general sections often feel like missed opportunities falling short of conveying some of the fundamentals. For instance, on several occasions, the reader is exposed to the outcomes of a particular model, but with limited, if any, explanation of the underlying mechanics, i.e. how and why the coded variables and model architecture lead to a particular behaviour. In line with the overall progressive structure, some of these questions and associated concepts and techniques are discussed in Part III, but this is too often done in an abstract, general way. Far more attention could and should have been devoted to the analysis of the outcome of a model, not simply in view of understanding the functioning of the model, but also its potential relevance to archaeological reasoning. The acquisition of the required coding skills is clearly necessary and the focus of the present volume, but the comparatively limited engagement with some

of the more conceptual dimensions leads, in my opinion, to a somewhat unfinished pedagogic experience.

On a practical note, the existence of a freely accessible online pdf version is noteworthy (available in the aforementioned github repository. This matters especially for the excellent appendix on the use of colour-blind palettes, whose quality and importance is obviously lost in the greyscale paperback used for this review.

All in all, this never intended to be and is indeed not the ultimate introduction to ABM in archaeology. This being said, this volume and its repository of models work provide the companion of choice to supplement and illustrate classes on ABM in archaeology, and thus to teach this fundamental technique to a new generation of practitioners.