BOOK REVIEW

THE MODEL THINKER: WHAT YOU NEED TO KNOW TO MAKE DATA WORK FOR YOU BY SCOTT E. PAGE, PH.D.

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The understanding of and ability to use models is important for researchers, academics, economists, and others. It is especially important for people in business to understand and be able to use models; but people in business often don't have the background in model building that people in the academic and scientific disciplines have.

In *The Model Thinker* (2018), Scott Page, Ph.D. provides a detailed treatise on the background, use of, and building of a wide variety of mathematical, statistical, and computational models. The models covered include game theory, random walks, linear regression, and many more. For the most part, Dr. Page explains the models in non-mathematical terms. This should make model building accessible to a much wider audience than what has been the case before.

Dr. Page is the Leonid Hurwicz Collegiate Professor of Complex Systems, Political Science, and Economics at the University of Michigan. He also teaches a popular course on model building at *Coursera*, a "massive open online course (MOOC)" provider.

The purpose of writing the book on model building is, as Dr. Page likes to say, to help people become better thinkers and to become more informed citizens of the world. Page seeks to help people see the beauty of models and that modeling can be fun. The book's overall aim is to make models accessible to more people and to illustrate the practical uses of models. It serves as a very useful dictionary of the various models in use today. It does not cover hundreds of models – just a few of the more important models from a variety of disciplines. The models fall into three general categories: (1) simplifications of the world, what he calls an *embodiment approach,* that strips away unnecessary dimensions and attributes; (2) mathematical analogies, the *analogy approach*, which tries to capture the essence of a process – not the exact process itself; and (3) exploratory, artificial constructs, the *alternative reality approach*, which intentionally does not represent reality, but provides a place where people can experiment and think outside of our current reality.

A main point of the book is that no one model is good enough to be used alone; and that no one model can be used in all circumstances. Accordingly, Page advocates a multi-model approach which he calls "many model thinking." In his view, many model thinking leads to better decision-making; more robust designs of problem-solving models; and better predictions of business, social, and scientific phenomena. As Page (2018) states: "The logic behind the many-model approach builds on the age-old idea that we achieve wisdom through a multiplicity of lenses." In an extension of this idea, Page (2018) notes that "…any collection of diverse models (or people) will be more accurate than its average member, a phenomenon referred to as the *wisdom of crowds*."

Page even provides a theorem in the book to explain why he believes the wisdom of crowds is a valid construct. Overall, Page shows in the book that using more than one model permits one to look at problems through multiple lenses.

The world is awash in data. By means of the Internet, anyone can access a vast amount of data on almost any topic. The rationale for building models is that data alone is not enough. One needs models to organize the data and to make sense of it.

Models also help in understanding complexity; in other words, understanding the complex nature of the world (and universe) in which we live. One of Page's goals in writing this book is to give his students and readers of this book tools to improve their abilities to reason, explain, design, communicate, act, predict and explore (a construct which Page has formed into an acronym, REDCAPE, to help people remember the benefits of many-model thinking). Page (2018) quotes Charlie Munger, the Vice-Chairman of Berkshire Hathaway and a renowned thinker, as saying: "To become wise, you've got to have models in your head. And you've got to array your experience – both vicarious and direct – on this latticework of models."

A further benefit of models is that they impose a cognitive discipline on us that helps to counter our inherent cognitive biases – such biases as overweighting recent events and loss aversion (Kahneman, 2011, p. 282), to name a couple. Such biases result from our limited capacity as humans to store and process data in our heads; as well as the emotional factors that inhibit our ability to think reasonably. Models help us overcome these limitations and become better thinkers.

In *The Model Thinker*, we are introduced to a paradigm of how models transform data into wisdom. The process is combined into a *wisdom hierarchy* and works this way: (1) at the bottom of the wisdom hierarchy lie *data*; (2) *information* names and partitions data into categories; (3) *Knowledge* organizes information; and (4) *wisdom* is attained when one is able to identify and apply relevant knowledge. Dr. Page maintains that many-model thinking is required to attain wisdom.

Dr. Page (2018) defines models as "formal structures represented in mathematics and diagrams that help us to understand the world." In his book, *Theory Building*, which is a complete treatise on constructing theories, Dubin (1978) provides a similar perspective on model building: "Most theoretical models are presumed to represent a complex portion of the real world…" (p.8).

The course that Dr. Page teaches at *Coursera* is a massive open online course (MOOC). MOOCs provide for unlimited participation and open access via the web. The course is free or can be taken by paying a small fee and getting a certificate upon completion. There are more resources available to the course participant who pays the fee. I found the course to be generally helpful in further understanding the material in the book. Reading the book and taking the Coursera course together is a good combination.

Dr. Page has provided a useful and practical treatise on models and model building. He has provided a convincing argument that many-model thinking is superior to using just one model to understand a phenomenon. While Page has attempted to use a non-mathematical, easy-to-understand approach to understanding models, it is nonetheless a difficult field of study. Many

people may come away from having read this book (and/or taking the accompanying Coursera course) a little frustrated in their lack of understanding of the material. But given the importance of model thinking in today's complex world, I believe that those involved in business, academia, the sciences, and other fields and disciplines involving rigorous study and application, should at least give the book and/or course a try. One may ultimately have to obtain expert advice on model building, but knowing the uses and limitations of various models will help in finding the right expert advice and being able to critique and effectively use the advice given.

References

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