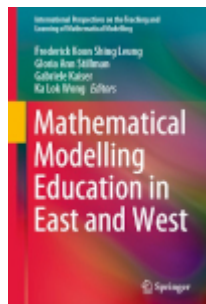




Mathematical Modelling Education in East and West



Frederick Koon Shing Leung, Gloria Ann Stillman, Gabriele Kaiser, and Ka Lok Wong

Publisher: Springer
Publication Date: 2021
Number of Pages: 684
Format: Hardcover
Price: \$149.99
ISBN: 978-3-030-66995-9
Category: Collection

MAA REVIEW

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[Reviewed by Johnna Barnaby, on 11/14/2021]

The goal of this book, a collection of independent papers, is to increase the number of students interested in math focused careers by enabling instructors to include real-world examples in their classes. The authors recognize the importance of using real world applications to motivate the content, recognizing that culture has an influence on how students understand math modeling in the classroom. This book addresses the many challenges an instructor may face when incorporating math modeling, as well as provides examples for how to include math modeling into their classrooms; it is a collection of papers that address various topics, such as theoretical issues, pedagogical issues, assessment issues, and innovative teaching approaches when incorporating math modeling in the classroom.

Chapter authors present a challenge, misunderstanding, or helpful tip for incorporating math modeling in a lesson and include sample lessons. For example, the chapter on computational thinking highlights the importance of taking a problem and critically thinking through possible steps to find a solution and then using technology to get at a solution. In many schools, computational thinking is equated with coding. The author illustrates how that can be a disadvantage to students. While the strategies needed for successful coding should include computation thinking, just being able to write code does not mean the student can successfully think through a problem. At the end of the chapter, there are three models an instructor could use to incorporate computational thinking in the classroom.

The book includes a section on pedagogical issues instructors may face and many of the chapters explore the issue from the side of the students, the various cultural or social backgrounds the students come from, researching how students learn from a modeling framework, and analyzing students' perspectives on this type of learning. However, there are also chapters that are instructor focused. These chapters focus on preparing instructors to teach math modeling to students, looking at an overview of teacher competencies for math modeling as well as feedback from teachers on these competencies. As math modeling in the classroom continues to be mandated, they also challenge the community to continue to develop teacher competencies.

There is an entire section of the book dedicated to instructors sharing their experience and expertise incorporating math modeling in the classroom, including incorporating modeling differently in their class and showing the variety of ways that modeling can be incorporated, from math trails to math competitions. One author shares their 55 years of experience teaching through modeling, how it has changed through the years, and challenges instructors may face. Another author highlights how math modeling leads to group creativity and that the dynamics within a group lead to differing understandings between groups as well as complexities of models.

Overall, this book provides new research into mathematical modeling as a method of instruction. Not only does it provide data to back up the usefulness of mathematical modeling, it highlights strategies and possible challenges and pitfalls an instructor may face when including modeling in a class. It also provides concrete examples and models one could use in a course.

Johnna Barnaby is an Assistant Professor of Mathematics at Shippensburg University. Her research is in math modeling, specifically biomathematics models.

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