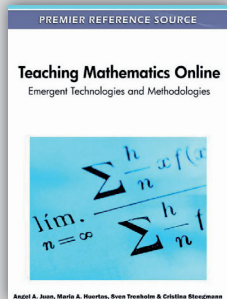


BOOK REVIEW



Teaching Mathematics Online: Emergent Technologies and Methodologies

Edited by Angel A. Juan, Maria A. Huertas,
Sven Trenholm and Cristina Steegmann (2011).

Hershey, PA: IGI Global. 414 pages.

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Abstract

The following text reviews the book *Teaching Mathematics Online: Emergent Technologies and Methodologies*, recently published by IGI Global. This book brings together experiences and best practices related to the use of Web-based and computer-based methodologies to teach and learn mathematics courses in higher education. Although there is a plethora of books on e-learning and also a considerable amount of books on mathematics learning in secondary education, this is – as far as we know – the first book combining e-learning and mathematical education at the university level. Thus, it constitutes a basic reference for academics and practitioners of this constantly emerging field.

Keywords

e-learning, mathematical education, higher education, computer-supported learning

Resumen

El siguiente texto es una reseña del libro Teaching Mathematics Online: Emergent Technologies and Methodologies, publicado recientemente por IGI Global. En él se han reunido una serie de experiencias y mejores prácticas relacionadas con el uso de metodologías basadas en internet y en sistemas informáticos que tienen por objeto la enseñanza y el aprendizaje de las matemáticas en el ciclo educativo superior. Pese a la gran cantidad de libros existentes sobre e-learning y la abundancia de obras referidas a la enseñanza de las matemáticas en el ciclo educativo secundario, este es –que sepamos– el primer libro que combina e-learning y enseñanza de las matemáticas a un nivel universitario. Así pues, nos hallamos ante una referencia básica para entornos tanto académicos como profesionales de esta disciplina en constante evolución.

Palabras clave

e-learning, enseñanza de las matemáticas, enseñanza superior, aprendizaje asistido por ordenador

In this voluminous book of over 400 pages, the editors bring together 18 chapters on mathematics e-learning. They do so for two main reasons, as quoted below:

- “to provide insight and understanding into practical pedagogical and methodological issues related to mathematics e-learning,” and
- “to provide insight and understanding into current and future trends regarding how mathematics instruction is being facilitated and leveraged with Web-based and other emerging technologies.”

The book contains a variety of chapters, addressing many interesting developments within the area of technology-enhanced mathematics learning. It contains chapters discussing best practices regarding mathematics e-learning in higher education, chapters providing theoretical or applied pedagogical models in mathematics e-learning, chapters describing emerging technologies and mathematical software used in mathematics teaching online, as well as chapters presenting up-to-date research work on how mathematics education is changing through the use of online teaching methods.

The book starts with an introduction by the editors. They give an overview of the various chapters, which they have grouped into the following three sections:

1. Blended Experiences in Mathematics e-Learning
2. Pure Online Experiences in Mathematics e-Learning
3. Mathematics Software & Web Resources for Mathematics e-Learning

The chapters are equally divided over the three sections. We briefly summarize the content of the various sections and chapters.

The first section focuses on experiences in mathematical e-learning, in which face-to-face teaching is blended with distance or online instruction. It starts with a chapter by Miller describing

the successful implementation of an asynchronous model for online discussions on a mathematics course for mathematics teachers. The section continues with a chapter by Abramovitz et al. on a blended experience in calculus courses for undergraduate engineering students, in which online assessments are used to help students understand theoretical concepts and theorems, and with a chapter by B. Loch, in which she describes how screencasts of live lectures as well as screencasts of short snippets of theory or examples have been used within an operations research course to supply online students with just-in-time information. Chapters 4 to 6 by Albano, Perdue and Divjak, respectively, discuss some experiences using general e-learning tools, ranging from LMSs, wikis and speaking avatars to video and social media, to enhance their face-to-face mathematics courses.

The second section of the book is devoted to experiences of purely online mathematics e-learning. It contains two chapters on the use of online communication and collaboration tools by Meletiou-Mavrotheris and by Silverman and Clay, both focusing on the education of mathematics teachers, and two chapters on the use and impact of online teaching material in bridging courses in mathematics for the transition from high school to university by Tempelaar et al. and by Biehler et al. The other two chapters by Jarvis and by Trenholm et al. both identify, review and evaluate a number of models and methods of mathematics e-learning.

The final section of the book is concerned with mathematical software and Web resources for mathematics e-learning. It contains a chapter by Cherkas and Welder reviewing some popular websites, a chapter by Alcazar et al. describing experiences with the software packages WIRIS, GeoGebra, SAGE and Wolfram Alpha, and a chapter by Lokar et al. describing the NAUK.si initiative to create Web-based learning blocks. Badger and Sangwin discuss the use of Gröbner basis techniques in the automatic grading of online exercises involving systems of equations. Misfeldt and Sanne discuss the problems that both students and lecturers face when writing mathematical formulas on a computer, as well as some solutions to these problems. The last chapter by Mac an Bhaird and O'Shea reviews a number of general-purpose software tools to be used in mathematics classes, including podcasts, screencasts and videos.

With this book, the editors have indeed succeeded in reaching their goals. They have brought together a great variety of interesting information about online Web resources and their use in both blended and online mathematics teaching. This collection of chapters provides a good insight into teaching methods, trends and possibilities offered by technology-enhanced mathematics learning.

Mathematics educators will certainly find both information and motivation in several chapters to improve their teaching through the good use of technology and online resources.

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Cristina Steegmann has more than 10 years of experience teaching mathematics online to engineering students. Her doctoral research focuses on mathematical e-learning in the context of the European Higher Education Area. As a result, she has participated in different research projects on that topic and is co-author of several papers and chapters published in international journals and books.

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