Foreword

Since the early decades of the previous century, substantial technological transformations in the field of Information and Communication technologies have transformed irreversibly the ways individuals learn, work, communicate, spend leisure time and function in everyday life. As well, these transformations have had profound social, economic, cultural and political impact – we live in what has been already acknowledged as post-industrial, digital, knowledge society.

Foundational knowledge underlying these developments relates to the STEM disciplines. STEM related knowledge is the main engine driving innovation entrepreneurship and development, which in turn affect all venues of life. Thus, the understandable social demand for encouraging high quality STEM education at all levels in the educational system, starting from the early stages.

In order to answer this demand and reach the goal of optimizing STEM education, ICTs play a substantial role. Thus, an interesting recursive cycle has been generated in education: STEM knowledge is at the foundation of ICTs development, which in turn have the potential to support the learning of STEM knowledge – fostering the goal to continue to enhance ICTs development.

The chapter in this book are extraordinary evidence of the multiple ways ICTs might be harnessed to support STEM education. First, they describe the use of a wide range of technologies, e.g., mobile devices, the Web, wearable trackers, simulation software, big data analysis or virtual labs. As well, they present a variety of pedagogical modalities both for individual and collaborative learning addressing a range of cognitive skills. They also cover a sample of subjects showing the potential of ICTs to support learning in different content areas.

As ICT itself, the use of the technologies for teaching and learning continues to be an "under construction" field. New and intriguing technological/pedagogical solutions are being created, studied and implemented continuously. STEM education, by its nature, has proven to be a highly rich field for ICT-based pedagogical innovation. The works presented by the authors of the chapters in this book are evidence of this richness, of the gains already obtained, and of the numerous questions still to be explored as the field advances.

David Mioduser
Professor, Head of the School of Education,
Tel Aviv University, Israel

Prof. David Mioduser *is a Head of the School of Education at Tel Aviv University. His research concerns the cognitive aspects and learning processes in the encounter between learners and technology, and focuses on two main fields: one – young children's development of conceptions, skills and technological thinking, and the second – current technology-integrated learning. Prof. Mioduser participates in projects taking place in educational institutions in the country's center and the periphery. During recent years he has been a research partner in international studies conducted under the auspices of the European Union, the OECD and the IEA on integrating up-to-date technology in teaching and learning.*