Preface

The constantly changing landscape of K-12 Education challenges experts and practitioners to stay apprized of the field’s most up-to-date research. That is why Information Science Reference is pleased to offer this three-volume reference collection that will empower students, researchers, and academicians with a strong understanding of critical issues within K-12 Education by providing both broad and detailed perspectives on cutting-edge theories and developments in the field. This collection is designed to act as a single reference source on conceptual, methodological, and technical issues, as well as provide insight into emerging trends and future opportunities within the discipline.

*K-12 Education: Concepts, Methodologies, Tools, and Applications* is organized into six distinct sections that provide comprehensive coverage of important topics. The sections are (1) Fundamental Concepts and Theories, (2) Development and Design Methodologies, (3) Tools and Technologies, (4) Utilization and Application, (5) Critical Issues, and (6) Emerging Trends. The following paragraphs provide a summary of what readers may expect from this invaluable reference tool.

Section 1, “Fundamental Concepts and Theories”, opens with a discussion of information and communication technologies in K-12 Education. The introductory chapters provide an overview of ICT in the classroom, including chapters such as *Using Digital Tools to Teach Writing in K-12 Classrooms* by Rebecca S. Anderson, Gretchen S. Goode, Jessica S. Mitchell, and Rachael F. Thompson and *Integrated Technology for Culturally Competent Communication in Urban Schools* by Maura Wechsler Linas and Joan E. Aitken. Additional topics include ICT use for inclusive education, teacher education, and educational games, themes that will have a large impact on the rest of the compilation. One chapter of note, *Meeting the Needs of Exceptional Students* by Timothy J. Frey and E. Ann Knackendoffel, explores the issue of using educational technologies to create a learning environment that can cater to a diverse range of students with various challenges and needs. The final chapter in this section, *A Perspective on Games and Patterns* by Dores Ferreira, Pedro Palhares, and Jorge Nuno Silva, serves as a transition into the next section, which covers educational games among other topics.

Section 2, “Development and Design Methodologies”, focuses on curriculum development in K-12 Education, with emphasis on the use of learning technologies in the classroom. The opening chapters of this section deal with educational games, including *Elements of Game Design* by Danielle Herro and *Ethical Considerations for Learning Game, Simulation, and Virtual World Design and Development* by Scott J. Warren and Lin Lin. The second half of this section concentrates on pedagogies for education in the STEM fields. *Developing a Web Application for the Integration of Real-World, Scientific, Problem-Solving into the Secondary Classroom* by Susan E. Gill, Nanette I. Marcum-Dietrich, and John Fraser demonstrates how the use of online media can help engage young students who have grown up in a world where such technologies are commonplace. Similarly, *Implementing Common Core State Standards using Digital Curriculum* by Michelle Rutherford utilizes blended learning techniques to
prepare students to succeed in mathematics courses. Finally, the last two chapters of this section, *Generating Transferable Skills in STEM through Educational Robotics* by Carl A. Nelson and *Developing and Evaluating a Web-Based, Multi-Platform Curriculum for After-School Robotics* by Fred G. Martin, Michelle Scribner-MacLean, Sam Christy, and Ivan Rudnicki, describe specific programs teaching K-12 students the fundamentals of robotics.

Section 3, “Tools and Technologies”, explores the software, equipment, and devices used to augment the learning process in K-12 Education. The first chapter in this section continues the discussion of robotics classrooms begun in Section Two with *Robotics and Problem-Based Learning in STEM Formal Educational Environments* by Neal Grandgenett, Elliott Ostler, Neal Topp, and Robert Goeman. The next chapters investigate tangible technologies, such as interactive whiteboards, iPads, and laptop computers. From there, this section focuses on software and applications, such as mathematics programs in *The Incorporation of Geometer’s Sketchpad in a High School Geometry Curriculum* by Lisa Ames, Heejung An, and Sandra Alon as well as educational games and virtual environments in *A MUVEing Success* by Shannon Kennedy-Clark and Kate Thompson. This section concludes with chapters on learning technologies for literacy education, notably *Reading Beyond the Borders* by Jason T. Edwards and *Technology Toolbox for the K-12 Literacy Teacher* by James R. Stachowiak and Liz Hollingworth, two contributions that explore some of the many ways teachers can engage their students using modern digital tools.

Section 4, “Utilization and Application”, presents some of the various means by which information and communication technologies can be used in K-12 Education settings. The most extensive section in this multi-volume work, the chapters in Section Four cover topics such as simulations and games, religious education, computer visualization, virtual learning environments, and more. Introducing this section is *The Impact of Blogging and Scaffolding on Primary School Pupils’ Narrative Writing* by Ruth Mei Fen Wong and Khe Foon Hew, a chapter that combines the use of online technologies with education in the traditional classroom. Another early chapter, *A Furry Partnership* by Mary L. Hall describes a decidedly low-tech approach to literacy education: using therapy dogs to help students improve their reading skills. Chapters such as *The History of Religions as a Tool for Citizenship Education of Children* by Mariachiara Giorda, Giulia Nardini, and Beatrice Nuti and *INFOhio Transforms Content Delivery for PreK-12 Students* by Theresa M. Fredericka and Jennifer Schwelik prepare students to take their place in the global society and engage in lifelong learning. Finally, the concluding chapters serve as a transition into Section Five with a discussion of how online communities assist in students’ learning.

Section 5, “Critical Issues”, evaluates the use of technologies in the classroom and how this impacts the effectiveness of K-12 Education. The first chapter in this section, *Weebly, Wikis, and Digital Storytelling* by Brian Kissel, discusses online tools and the teaching of writing in K-12 classrooms. Most of the chapters in this section follow a similar thematic context, focusing on learning through mobile devices, interactive virtual environments, computer applications, and more. *Should Traditional Classrooms Have Formal Facebook Groups?* by Mark Hart explores a blended learning strategy in a high school AP History class, and *Going 1:1 with Laptop Computers in an Independent, Co-Educational Middle and High School* by Natalie B. Milman, Marilyn Hillarious, Vince O’Neill, and Bryce Walker considers a classroom in which every student is provided with a portable computer. The last chapter in this section, *Issues and Challenges in Preparing Teachers to Teach in the Twenty-First Century* by Susan Gibson provides an overview of pre-service teacher education and training in the use of emerging technologies.

Section 6, “Emerging Trends”, completes the work with an investigation into some of the latest developments in K-12 Education pedagogy and practice. In particular, the majority of the chapters in this
section cover the topic of teacher education, as the newest teachers will be at the forefront of educational innovation. Notable chapters include Training Teachers for a Virtual School System by Michael K. Barbour, Integrating Technology in Teacher Education Programs by James N. Oigara, and Overcoming the Tensions and Challenges of Technology Integration by Erica C. Boling and Jeanine Beatty. Other chapters describe innovative new tools and techniques for use in traditional as well as online classrooms, such as Music Composition for Creative Thinking by Maria Maddalena Erman and Embedded Librarianship by Buffy J. Hamilton. Learning on the Move in the Web 2.0 by Carlos Baladrón, Javier M. Aguiar, Lorena Calavia, Belén Carro, and Antonio Sánchez-Esguevillas presents future trends and innovations in m-learning, and the final chapter in this section, The Next Frontier in Public Education by Belinda M. Cambre, epitomizes the content of this multi-volume reference by investigating cyber charter schools as the future of K-12 public education.

As a comprehensive collection of research on current findings related to the development of interdisciplinary technologies, K-12 Education: Concepts, Methodologies, Tools, and Applications provides researchers, administrators, and all audiences with a complete understanding of the latest advances, applications, and concepts in K-12 Education. Although the primary organization of the contents in this multi-volume work is based on its six sections, offering a progression of coverage on the important concepts, methodologies, technologies, applications, critical concerns, and emerging trends, the reader can also identify specific content by utilizing the extensive indexing system found at the end of each volume. Given the vast number of issues concerning usage, successes and failures, policies, strategies, and applications of K-12 Education in countries around the world, K-12 Education: Concepts, Methodologies, Tools, and Applications addresses the demand for a resource that encompasses the most pertinent research on the technologies being employed to globally bolster the knowledge and implementation of K-12 Education.