Promoting Computational Thinking With Programming

The IEEE Global Engineering Education Conference (EDUCON) 2021 is the twelfth in a series of conferences that rotate among central locations in IEEE Region 8 (Europe, Middle East and North Africa) EDUCON is the flagship conference of the IEEE Education Society. Computational technologies have been impacting human life for years. Teaching methods must adapt accordingly to provide the next generation with the necessary knowledge to further advance these human-assistive technologies. Teaching Computational Thinking in Primary Education is a crucial resource that examines the impact that instructing with a computational focus can have on future learners. Highlighting relevant topics that include multifaceted skillsets, coding, programming methods, and digital games, this scholarly publication is ideal for educators, academicians, students, and researchers who are interested in discovering how the future of education is being shaped. This book covers studies of computational thinking related to linking, infusing, and embedding computational thinking elements to school curricula, teacher education and STEM related subjects. Presenting the distinguished and exemplary works by educators and researchers in the field highlighting the contemporary trends and issues, creative and unique approaches, innovative methods, frameworks, pedagogies and theoretical and practical aspects in computational thinking. A decade ago the notion of computational thinking was introduced by Jeannette Wing and envisioned that computational thinking will be a fundamental skill that complements to reading, writing and arithmetic for everyone and represents a universally applicable attitude. The computational thinking is considered a thought processes involved in a way of solving problems, designing systems, and understanding human behaviour. Assimilating computational thinking at young age will assist them to enhance problem solving skills, improve logical reasoning, and advance analytical ability - key attributes to succeed in the 21st century. Educators around the world are investing their relentless effort in equipping the young generation with real-world skills ready for the demand and challenges of the future. It is commonly believed that computational thinking will play a pivotal and dominant role in this endeavour. Wide-ranging research on and application of computational thinking in education have been emerged in the last ten years. This book will document attempts to conduct systematic, prodigious and multidisciplinary research in computational thinking and present their findings and accomplishments.

Research Anthology on Computational Thinking, Programming, and Robotics in the Classroom

This Handbook describes the extent and shape of computing education research today. Over fifty leading researchers from academia and industry (including Google and Microsoft) have contributed chapters that together define and expand the evidence base. The foundational chapters set the field in context, articulate expertise from key disciplines, and form a practical guide for new researchers. They address what can be learned empirically, methodologically and theoretically from each area. The topic chapters explore issues that are of current interest, why they matter, and what is already known. They include discussion of motivational context, implications for practice, and open questions which might suggest future research. The authors provide an authoritative introduction to the field and is essential reading for policy makers, as well as both new and established researchers.

Introduce young children to the building and programming of robots through playful, developmentally appropriate activities. Many early childhood professionals are unfamiliar with computer science, robotics, and engineering concepts. This user-friendly and accessible book gives teachers great ideas for engaging young children with 100 exciting hands-on computer science and engineering activities. The book
can be easily included in a developmentally appropriate curriculum and offers a balance of adult-facilitated and child-centered activities. Ann Gadzikowski has more than twenty-five years of experience as a teacher and director of early childhood programs, and is the Early Childhood Coordinator for Northwestern University’s Center for Talent Development and oversees the summer Leapfrog Program. Her book Creating a Beautiful Mess: Ten Essential Play Experiences for a Joyous Childhood won gold in the 2015 National Parenting Publications Awards. The education system is constantly growing and developing as more ways to teach and learn are implemented into the classroom. Recently, there has been a growing interest in teaching computational thinking with schools all over the world introducing it to the curriculum due to its ability to allow students to become proficient at problem solving using logic, an essential life skill. In order to provide the best education possible, it is imperative that computational thinking strategies, along with programming skills and the use of robotics in the classroom, be implemented in order for students to achieve maximum thought processing skills and computer competencies. The Research Anthology on Computational Thinking, Programming, and Robotics in the Classroom is an all-encompassing reference book that discusses how computational thinking, programming, and robotics can be used in education as well as the benefits and difficulties of implementing these elements into the classroom. The book includes strategies for preparing educators to teach computational thinking in the classroom as well as design techniques for incorporating these practices into various levels of school curriculum and within a variety of subjects. Covering topics ranging from decomposition to robot learning, this book is ideal for educators, computer scientists, administrators, academicians, students, and anyone interested in learning more about how computational thinking, programming, and robotics can change the current education system.

This book constitutes the proceedings of the 14th International Conference on Informatics in Schools: Situation, Evolution and Perspectives, ISSEP 2021, held in Nijmegen, The Netherlands, in November 2020. Due to COVID-19 related travelling restrictions the conference had to be switched to online format. The 12 full papers presented were carefully reviewed and selected from 29 submissions. They are organized in topical sections named: Fostering Computational Thinking, Programming Education, Advancing Computing Education, and Teachers’ Professional Development.

Computational thinking (CT) is a timeless, transferable skill that enables you to think more clearly and logically, as well as a way to solve specific problems. With this book you'll learn to apply computational thinking in the context of software development to give you a head start on the road to becoming an experienced and effective programmer.

Empower tomorrow’s tech innovators Our students are avid users and consumers of technology. Isn’t it time that they see themselves as the next technological innovators, too? Computational Thinking and Coding for Every Student is the beginner’s guide for K-12 educators who want to learn to integrate the basics of computer science into their curriculum. Readers will find Strategies and activities for teaching computational thinking and coding inside and outside of school, at any grade level, across disciplines Instruction-ready lessons for every grade A discussion guide and companion website with videos, activities, and other resources

Mobile technologies combined with an interdisciplinary approach to knowledge and organization of learning experiences that are meaningful to children could create a creative and interactive learning environment different from that of
traditional teaching. Making good use of mobile learning with appropriate devices will increase the learning motivations of
the students and help them bring about positive performance. Mobile Learning Applications in Early Childhood Education
is a collection of innovative research on the methods and applications of mobile learning techniques and strategies within
diversified teaching settings. While highlighting topics including computational thinking, ubiquitous learning, and social
development, this book is ideally designed for researchers, teachers, parents, curriculum developers, instructional
designers, academicians, students, and practitioners seeking current research on the application of mobile technology
within child education.
Lesson planning and subject knowledge go hand in hand in this exciting new edition covering all teachers need to know
to confidently teach the computing curriculum as well as explore opportunities for cross-curricular teaching.
While the growth of computational thinking has brought new awareness to the importance of computing education, it has
also created new challenges. Many educational initiatives focus solely on the programming aspects, such as variables,
loops, conditionals, parallelism, operators, and data handling, divorcing computing from real-world contexts and
applications. This decontextualization threatens to make learners believe that they do not need to learn computing, as
they cannot envision a future in which they will need to use it, just as many see math and physics education as
unnecessary. The Handbook of Research on Tools for Teaching Computational Thinking in P-12 Education is a cutting-
edge research publication that examines the implementation of computational thinking into school curriculum in order to
develop creative problem-solving skills and to build a computational identity which will allow for future STEM growth.
Moreover, the book advocates for a new approach to computing education that argues that while learning about
computing, young people should also have opportunities to create with computing, which will have a direct impact on
their lives and their communities. Featuring a wide range of topics such as assessment, digital teaching, and educational
robotics, this book is ideal for academicians, instructional designers, teachers, education professionals, administrators,
researchers, and students.
This book constitutes the refereed proceedings of the 10th International Conference on Informatics in Schools: Situation,
Evolution, and Perspectives, ISSEP 2017, held in Helsinki, Finland, in November 2017. The 18 full papers presented
together with 1 invited talk were carefully reviewed and selected from 41 submissions. ISSEP presents this year a broad
range of themes ranging from making informatics accessible to visually impaired students and computational thinking to
context- and country specific challenges as well as teacher development and training.
This book is open access under a CC BY 4.0 license. This book offers a comprehensive guide, covering every
important aspect of computational thinking education. It provides an in-depth discussion of computational thinking,
including the notion of perceiving computational thinking practices as ways of mapping models from the abstraction of data and process structures to natural phenomena. Further, it explores how computational thinking education is implemented in different regions, and how computational thinking is being integrated into subject learning in K-12 education. In closing, it discusses computational thinking from the perspective of STEM education, the use of video games to teach computational thinking, and how computational thinking is helping to transform the quality of the workforce in the textile and apparel industry. This work was published by Saint Philip Street Press pursuant to a Creative Commons license permitting commercial use. All rights not granted by the work's license are retained by the author or authors.

Coding as a Playground is the first book to focus on how young children (ages 7 and under) can engage in computational thinking and be taught to become computer programmers, a process that can increase both their cognitive and social-emotional skills. Readers will learn how coding can engage children as producers—and not merely consumers—of technology in a playful way. You will come away from this groundbreaking work with an understanding of how coding promotes developmentally appropriate experiences such as problem solving, imagination, cognitive challenges, social interactions, motor skills development, emotional exploration, and making different choices. You will also learn how to integrate coding into different curricular areas to promote literacy, math, science, engineering, and the arts through a project-based approach.

A comprehensive look at the promise and potential of online learning In our digital age, students have dramatically new learning needs and must be prepared for the idea economy of the future. In Getting Smart, well-known global education expert Tom Vander Ark examines the facets of educational innovation in the United States and abroad. Vander Ark makes a convincing case for a blend of online and onsite learning, shares inspiring stories of schools and programs that effectively offer "personal digital learning" opportunities, and discusses what we need to do to remake our schools into "smart schools." Examines the innovation-driven world, discusses how to combine online and onsite learning, and reviews "smart tools" for learning Investigates the lives of learning professionals, outlines the new employment bargain, examines online universities and "smart schools" Makes the case for smart capital, advocates for policies that create better learning, studies smart cultures

This book reports on research and practice on computational thinking and the effect it is having on education worldwide, both inside and outside of formal schooling. With coding becoming a required skill in an increasing number of national curricula (e.g., the United Kingdom, Israel, Estonia, Finland), the ability to think computationally is quickly becoming a primary 21st century "basic" domain of knowledge. The authors of this book investigate how this skill can be taught and its resultant effects on learning throughout a student's education, from elementary school to adult learning.

Why every child needs to learn to code: the shift from “computational thinking” to computational participation. Coding, once considered an arcane craft practiced by solitary techies, is now recognized by educators and theorists as a crucial skill, even a new literacy, for all children.
Programming is often promoted in K-12 schools as a way to encourage “computational thinking”—which has now become the umbrella term for understanding what computer science has to contribute to reasoning and communicating in an ever-increasingly digital world. In Connected Code, Yasmine Kafai and Quinn Burke argue that although computational thinking represents an excellent starting point, the broader conception of “computational participation” better captures the twenty-first-century reality. Computational participation moves beyond the individual to focus on wider social networks and a DIY culture of digital “making.” Kafai and Burke describe contemporary examples of computational participation: students who code not for the sake of coding but to create games, stories, and animations to share; the emergence of youth programming communities; the practices and ethical challenges of remixing (rather than starting from scratch); and the move beyond stationary screens to programmable toys, tools, and textiles.

This book presents a comprehensive overview of extant literature on competence-based vocational and professional education since the introduction of the competence concept in the 1950s. To structure the field, the book distinguishes between three approaches to defining competence, based on 1. functional behaviourism, 2. integrated occupationalism, and 3. situated professionalism. It also distinguishes between two ways of operationalizing competence: 1. behaviour-oriented generic, and 2. task-oriented specific competence. Lastly, it identifies three kinds of competencies, related to: 1. specific activities, 2. known jobs, and 3. the unknown future. Competence for the unknown future must receive more attention, as our world is rapidly evolving and there are many ‘glocal’ challenges which call for innovation and a profound transformation of policies and practices. The book presents a range of different approaches to competence-based education, and demonstrates that competence-based education is a worldwide innovation, which is institutionalized in various ways. It presents the major theories and policies, specific components of educational systems, such as recognition, accreditation, modelling and assessment, and developments in discipline-oriented and transversal competence domains. The book concludes by synthesizing the different perspectives with the intention to contribute to further improving vocational and professional education policy and practice. João Santos, Deputy Head of Unit C5, Vocational Training and Adult Education, Directorate General for Employment, Social Affairs and Inclusion, European Commission: “This comprehensive work on competence-based education led by Martin Mulder, provides an excellent and timely contribution to the current debate on a New Skills Agenda for Europe, and the challenge of bridging the employment and education and training worlds closer together. This book will influence our work aimed at improving the relevance of vocational education to support initial and continuing vocational education and training policy and practice aimed at strengthening the key competencies for the 21st century.” Prof. Dr. Reinhold Weiss, Deputy President and Head of the Research, Federal Institute for Vocational Education and Training (BIBB), Bonn, Germany: “This book illustrates that the idea and concept of competence is not only a buzzword in educational debates but key to innovative pedagogical thinking as well as educational practice.” Prof. Dr. Johanna Lasonen, College of Education, University of South Florida, Tampa, USA: “Competence-based Vocational and Professional Education is one of the most important multi-disciplinary book in education and training. This path-breaking book offers a timely, rich and global perspective on the field. The book is a good resource for practitioners, policymakers and researchers.”

This edited volume contains reports of current research, and literature reviews of research, involving self-efficacy in various instructional technology contexts. The chapters represent international perspectives across the broad areas of K-12 education, higher education, teacher self-efficacy, and learner self-efficacy to capture a diverse cross section of research on these topics. The book includes reviews of existing literature and reports of new research, thus creating a comprehensive resource for researchers and designers interested in this general topic.
The book is especially relevant to students and researchers in educational technology, instructional technology, instructional design, learning sciences, and educational psychology.

Report of a Workshop on the Scope and Nature of Computational Thinking presents a number of perspectives on the definition and applicability of computational thinking. For example, one idea expressed during the workshop is that computational thinking is a fundamental analytical skill that everyone can use to help solve problems, design systems, and understand human behavior, making it useful in a number of fields. Supporters of this viewpoint believe that computational thinking is comparable to the linguistic, mathematical and logical reasoning taught to all children. Various efforts have been made to introduce K-12 students to the most basic and essential computational concepts and college curricula have tried to provide a basis for life-long learning of increasingly new and advanced computational concepts and technologies. At both ends of this spectrum, however, most efforts have not focused on fundamental concepts. The book discusses what some of those fundamental concepts might be. Report of a Workshop on the Scope and Nature of Computational Thinking explores the idea that as the use of computational devices is becoming increasingly widespread, computational thinking skills should be promulgated more broadly. The book is an excellent resource for professionals in a wide range of fields including educators and scientists.

Debates in ICT and Computing Education explores the major issues teachers encounter in their daily professional lives. It encourages critical reflection and aims to stimulate both novice and experienced teachers to think more deeply about their practice, and link research and evidence to what they have observed in schools. Chapters tackle established and contemporary issues enabling teachers to reach informed judgements and argue their point of view with deeper theoretical knowledge and understanding. Debates include teacherless classrooms; personalised learning; creativity; digital literacy; visual literacy; e-tools; learning platforms; and opportunities for lifelong learning.

This book is open access under a CC BY 4.0 license. This book offers a comprehensive guide, covering every important aspect of computational thinking education. It provides an in-depth discussion of computational thinking, including the notion of perceiving computational thinking practices as ways of mapping models from the abstraction of data and process structures to natural phenomena. Further, it explores how computational thinking education is implemented in different regions, and how computational thinking is being integrated into subject learning in K-12 education. In closing, it discusses computational thinking from the perspective of STEM education, the use of video games to teach computational thinking, and how computational thinking is helping to transform the quality of the workforce in the textile and apparel industry.

The new edition of an introductory text that teaches students the art of computational problem solving, covering topics ranging from simple algorithms to information visualization. This book introduces students with little or no prior programming experience to the art of computational problem solving using Python and various Python libraries, including PyLab. It provides students with skills that will enable them to make productive use of computational techniques, including some of the tools and techniques of data science for using computation to model and interpret data. The book is based on an MIT course (which became the most popular course offered through MIT's OpenCourseWare) and was developed for use not only in a conventional classroom but in a massive open online course (MOOC). This new edition has been updated for Python 3, reorganized to make it easier to use for courses that cover only a subset of the material,
and offers additional material including five new chapters. Students are introduced to Python and the basics of programming in the context of such computational concepts and techniques as exhaustive enumeration, bisection search, and efficient approximation algorithms. Although it covers such traditional topics as computational complexity and simple algorithms, the book focuses on a wide range of topics not found in most introductory texts, including information visualization, simulations to model randomness, computational techniques to understand data, and statistical techniques that inform (and misinform) as well as two related but relatively advanced topics: optimization problems and dynamic programming. This edition offers expanded material on statistics and machine learning and new chapters on Frequentist and Bayesian statistics.

This core text for trainee primary teachers is a guide to the teaching of computing and coding, and provides an exploration of how children develop their computational thinking.

Interactive mobile technologies have now become the core of many—if not all—fields of society. Not only do the younger generation of students expect a mobile working and learning environment, but also the new ideas, technologies and solutions introduced on a nearly daily basis also boost this trend. Discussing and assessing key trends in the mobile field were the primary aims of the 11th International Conference on Interactive Mobile Communication, Technologies and Learning (IMCL2017), which was held in Thessaloniki from 30 November to 01 December 2017. Since being founded in 2006, the conference has been devoted to new approaches in interactive mobile technologies, with a focus on learning. The IMCL conferences have in the meanwhile become a central forum of the exchange of new research results and relevant trends, as well as best practices. This book contains papers in the fields of: Future Trends and Emerging Mobile Technologies Design and Development of Mobile Learning Apps and Content Mobile Games—Gamification and Mobile Learning Adaptive Mobile Environments Augmented Reality and Immersive Applications Tangible, Embedded and Embodied Interaction Interactive Collaborative and Blended Learning Digital Technology in Sports Mobile Health Care and Training Multimedia Learning in Music Education 5G Network Infrastructure Case Studies Real-World Experiences

The content will appeal to a broad readership, including policymakers, academics, educators, researchers in pedagogy and learning theory, school teachers, the learning industry, further education lecturers, etc.

In 2008, the Computer and Information Science and Engineering Directorate of the National Science Foundation asked the National Research Council (NRC) to conduct two workshops to explore the nature of computational thinking and its cognitive and educational implications. The first workshop focused on the scope and nature of computational thinking and on articulating what "computational thinking for everyone" might mean. A report of that workshop was released in January 2010. Drawing in part on the proceedings of that workshop, Report of a Workshop of Pedagogical Aspects of
Computational Thinking, summarizes the second workshop, which was held February 4-5, 2010, in Washington, D.C., and focuses on pedagogical considerations for computational thinking. This workshop was structured to gather pedagogical inputs and insights from educators who have addressed computational thinking in their work with K-12 teachers and students. It illuminates different approaches to computational thinking and explores lessons learned and best practices. Individuals with a broad range of perspectives contributed to this report. Since the workshop was not intended to result in a consensus regarding the scope and nature of computational thinking, Report of a Workshop of Pedagogical Aspects of Computational Thinking does not contain findings or recommendations.

The call for case histories was announced in 2014 and 60 submissions were received, describing on an outline basis what was achieved with these applications of e-Learning. There were 36 interesting examples described in these abstracts which were invited to forward a completed case history. The panel of experts then chose 12 case history finalists who were invited to present their work at the 14th annual European Conference on e-Learning at the University of Hertfordshire at Hatfield in the UK in October, 2015. As can be seen from the Contents page, the topics presented range widely, as was expected when working with a subject like e-Learning. It may also be observed that the entrants come from many different parts of the world. The competition requires the 3 best to be chosen and it is clear that the judges will have a challenging task to select the winners.

Female non-programmers experience many factors that hinder their interest, participation, and success in programming. For many years, researchers have tried to solve the problem of attracting and maintaining girls and women to computing, yet the issue remains widespread today. Within this general problem area, I am particularly interested in studying whether and how programming skills and concepts can be taught to women who have already completed their formal education and are embedded in successful careers. Research on teaching females to code often focuses on issues of motivation and self-efficacy, with the assumption that educators must first address non-programmers attitudes and expectations about learning to program, before they can develop effective learning approaches. In parallel, other researchers have explored the goal of teaching computational thinking (CT), a set of preparatory concepts and skills for abstract thought that are believed to create a foundation for learning how to program. However, most studies of CT have aimed at improving the skills of K-12 and college-aged individuals. In contrast, my focus is on female professionals, so I have been exploring a different set of approaches, motivations and impacts of programming education on this population.

I used a design-based research approach to investigate the design, offering, implementation, and evaluation of an informal learning workshop series, Code for Her. I observed the expected self-perception outcomes (e.g., increases in coding self-efficacy), but at the same time I uncovered indirect and unanticipated social consequences of the workshop.
experiences (e.g., an increased willingness to engage in technical conversations at work). The limited exposure of a workshop may be enough to spark interest in programming, but it will not produce a "programmer". Instead I have proposed and have been exploring a new concept to expand current discussions of what we might try to promote through informal education on computing skills - computational grounding. I argue that it may be fruitful to use computational grounding as a lens on female professionals' introduction to and growing appreciation of computational methods - as they advance toward more programming-like behavior in the workplace and at home. I articulate the construct of computational grounding and have developed a survey instrument to track its development. Working with this concept in the context of Code for Her, I create a narrative of female non-programmers' as working professionals who have been largely ignored in the computing education pipeline, but who may experience a range of benefits from such education. I include in the work a careful analysis of the women's learning experiences and behaviors with respect to cultural perspectives that I offer for consideration in building and presenting informal programs for computing education. Finally, I discuss design principles for others to use in designing and providing such programs.

Social Issues in Computing provides information pertinent to the social implications of technology. This book presents the highly dynamic interaction between computers and society. Organized into 13 chapters, this book begins with an overview of the problems associated with computers and attempts to indicate some of the viewpoints, assumptions, and biases from which the discussion is undertaken. This text then examines in detail the effects of computers on society and describes the extent of computer use. Other chapters consider the disparities in computer use between various countries, as well as the degree to which various countries are able to share in the market for computer products and services. This book discusses as well the factors that led to the rapid and widespread adoption of computers. The final chapter deals with the effects of automation, computers, and technology. This book is a valuable resource for computer science students and research workers.

The advent of new technologies has been an impetus for rapid development in several industries. These recent advances push industry leaders to infuse new innovations into their various systems and processes. Global Implications of Emerging Technology Trends is a critical scholarly resource that examines major breakthroughs within technological areas on a global level. Featuring coverage on a broad range of topics, such as biometrics, nanotechnology, and wireless technologies, this book is geared towards academicians, practitioners, and researchers seeking current research manuscripts of the evolution of information science and technology. This book contains 11 chapters from various experts all over the world on mathematics education. It provides different perspective of how to establish connection within mathematics and beyond. The ideas are from different authors internationally and is practice-
oriented, based on empirical studies conducted by the various authors. This is a good illustration of linking theory with practice. Incorporating new methods and approaches in learning environments is imperative to the development of education systems. By enhancing learning processes, education becomes more attainable at all levels. The Handbook of Research on Instructional Systems and Educational Technology is an essential reference source for the latest scholarly research on new models, trends, and data for solving instructional and learning challenges in education. Featuring extensive coverage on a wide range of topics such as distance education, online learning, and blended learning, this publication is ideally designed for academicians, practitioners, researchers, and students seeking current research on the latest improvements in instructional systems. Over the last few years, increasing attention has been focused on the development of children’s acquisition of 21st-century skills and digital competences. Consequently, many education scholars have argued that teaching technology to young children is vital in keeping up with 21st-century employment patterns. Technologies, such as those that involve robotics or coding apps, come at a time when the demand for computing jobs around the globe is at an all-time high while its supply is at an all-time low. There is no doubt that coding with robotics is a wonderful tool for learners of all ages as it provides a catalyst to introduce them to computational thinking, algorithmic thinking, and project management. Additionally, recent studies argue that the use of a developmentally appropriate robotics curriculum can help to change negative stereotypes and ideas children may initially have about technology and engineering. The Handbook of Research on Using Educational Robotics to Facilitate Student Learning is an edited book that advocates for a new approach to computational thinking and computing education with the use of educational robotics and coding apps. The book argues that while learning about computing, young people should also have opportunities to create with computing, which have a direct impact on their lives and their communities. It develops two key dimensions for understanding and developing educational experiences that support students in engaging in computational action: (1) computational identity, which shows the importance of young people’s development of scientific identity for future STEM growth; and (2) digital empowerment to instill the belief that they can put their computational identity into action in authentic and meaningful ways. Covering subthemes including student competency and assessment, programming education, and teacher and mentor development, this book is ideal for teachers, instructional designers, educational technology developers, school administrators, academicians, researchers, and students.

Coding as a Playground, Second Edition focuses on how young children (aged 7 and under) can engage in computational thinking and be taught to become computer programmers, a process that can increase both their cognitive and social-emotional skills. Learn how coding can engage children as producers—and not merely consumers—of technology in a playful way. You will come away from this groundbreaking work with an understanding of how coding promotes developmentally appropriate experiences such as problem-solving, imagination, cognitive challenges, social interactions, motor skills development, emotional exploration, and making different choices. Featuring all-new case studies, vignettes, and projects, as well as an expanded focus on teaching coding as a new literacy, this second edition helps you learn how to integrate coding into different curricular areas to promote
literacy, math, science, engineering, and the arts through a project-based approach and a positive attitude to learning. As technology continues to play a pivotal role in society, education is a field that has become heavily influenced by these advancements. New learning methods are rapidly emerging and being implemented into classrooms across the world using software that is low cost and easy to handle. These tools are crucial in creating skillful learning techniques in classrooms, yet there is a lack of information and research on the subject. The Handbook of Research on Software for Gifted and Talented School Activities in K-12 Classrooms is an essential reference source that discusses newly developed but easy-to-handle and less costly software and tools and their implementation in real 21st-century classrooms worldwide. The book also helps and supports teachers to conduct gifted and talented school activities in K-12 classrooms. Featuring research on topics such as educational philosophy and skillful learning techniques, this book is ideally designed for software developers, educators, researchers, psychologists, instructional designers, curriculum developers, principals, academicians, and students seeking coverage on the emerging role that newly developed software plays in early education.

"This book starts with an introduction to the topic of computational thinking and young children and then presents chapters of different aspects to consider in teaching computational thinking to young children,"--
A book for anyone teaching computer science, from elementary school teachers and coding club coaches to parents looking for some guidance. Computer science opens more doors for today's youth than any other discipline - which is why Coding in the Classroom is your key to unlocking students' future potential. Author Ryan Somma untangles the current state of CS education standards; describes the cognitive, academic, and professional benefits of learning CS; and provides numerous strategies to promote computational thinking and get kids coding! Whether you're a teacher, an after-school coach, or a parent seeking accessible ways to boost your kid's computer savvy, Coding in the Classroom is here to help. With quick-start programming strategies, scaffolded exercises for every grade level, and ideas for designing CS events that promote student achievement, this book is a rock-solid roadmap to CS integration from a wide variety of on-ramps. You'll learn: • tips and resources for teaching programming concepts via in-class activities and games, without a computer • development environments that make coding and sharing web apps a breeze • lesson plans for the software lifecycle process and techniques for facilitating long-term projects • ways to craft interdisciplinary units that bridge CS and computational thinking with other content areas Coding in the Classroom does more than make CS less formidable - it makes it more fun! From learning computational thinking via board games to building their own websites, students are offered a variety of entry points for acquiring the skills they need to succeed in the 21st-century workforce. Moreover, Somma understands how schools operate - and he's got your back. You'll be empowered to advocate for the value of implementing CS across the curriculum, get stakeholder buy-in, and build the supportive, equitable coding community that your school deserves.

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