Table of Contents

Foreword ....................................................................................................................................................... xv

Preface .......................................................................................................................................................... xvii

Acknowledgment ........................................................................................................................................ xxv

Section 1
State of the Art

Chapter 1
Computer Science Education Research: An Overview and Some Proposals ........................................ 1
  Anabela de Jesus Gomes, Coimbra Institute of Engineering, Portugal & University of Coimbra, Portugal
  António José Mendes, University of Coimbra, Portugal
  Maria José Marcelino, University of Coimbra, Portugal

Chapter 2
Open Source Social Networks in Education ............................................................................................ 30
  Amine V. Bitar, University of Balamand, Lebanon
  Antoine M. Melki, University of Balamand, Lebanon

Chapter 3
Small-Group vs. Competitive Learning in Computer Science Classrooms: A Meta-Analytic Review ....................................................................................................................................... 46
  Sema A. Kalaian, Eastern Michigan University, USA
  Rafa M. Kasim, Indiana Tech University, USA

Chapter 4
A Review of Teaching and Learning through Practice of Optimization Algorithms ............................ 65
  J. Ángel Velázquez-Iturbide, Universidad Rey Juan Carlos, Spain
  Ouafae Debdi, Universidad Rey Juan Carlos, Spain
  Maximiliano Paredes-Velasco, Universidad Rey Juan Carlos, Spain
Section 2
Teaching Strategies

Chapter 5
Massive Open Online Course Management: Learning Science and Engineering through Peer-Reviewed Projects........89
   Ana M. Pessoa, Polytechnic Institute of Porto, Portugal
   Luis Coelho, Polytechnic Institute of Porto, Portugal
   Ruben Fernandes, Polytechnic Institute of Porto, Portugal

Chapter 6
Using Simulation Games in Teaching Formal Methods for Software Development........106
   Štefan Korečko, Technical University of Košice, Slovakia
   Ján Sorád, Technical University of Košice, Slovakia

Chapter 7
An Effective Way to Teach Language Processing Courses.................................131
   Maria João Varanda Pereira, Instituto Politécnico de Bragança, Portugal
   Nuno Oliveira, Universidade do Minho, Portugal
   Daniela da Cruz, Universidade do Minho, Portugal
   Pedro Rangel Henriques, Universidade do Minho, Portugal

Chapter 8
A Sports Science Approach to Computer Programming Education................153
   M. Costa Neves, SportTools – Technology for Sport Company, Portugal
   M. Ramires, SportTools – Technology for Sport Company, Portugal
   J. Carvalho, Polytechnic Institute of Setúbal, Portugal
   M. Piteira, Polytechnic Institute of Setúbal, Portugal
   J. Santos, Polytechnic Institute of Setúbal, Portugal
   N. Folgôa, Polytechnic Institute of Setúbal, Portugal
   M. Boavida, Polytechnic Institute of Setúbal, Portugal

Section 3
Frameworks and Tools

Chapter 9
Ensemble: An Innovative Approach to Practice Computer Programming...........173
   Ricardo Queirós, Polytechnic Institute of Porto, Portugal & University of Porto, Portugal
   José Paulo Leal, CRACS & INESC-Porto LA, Faculty of Sciences, University of Porto,
   Porto, Portugal
Chapter 10
Moodle-Based Tool to Improve Teaching and Learning of Relational Databases Design and SQL DML Queries ................................................................. 202

M. Antón-Rodríguez, University of Valladolid, Spain
M. A. Pérez-Juárez, University of Valladolid, Spain
M. I. Jiménez-Gómez, University of Valladolid, Spain
F. J. Díaz-Pernas, University of Valladolid, Spain
M. Martínez-Zarzuela, University of Valladolid, Spain
D. González-Ortega, University of Valladolid, Spain

Chapter 11
ZatLab: Programming a Framework for Gesture Recognition and Performance Interaction......... 224

André Baltazar, Catholic University of Portugal, Portugal
Luís Gustavo Martins, Catholic University of Portugal, Portugal

Chapter 12
Design a Computer Programming Learning Environment for Massive Open Online Courses ........255

Ricardo Queirós, Polytechnic Institute of Porto, Portugal & CRACS/INESC TEC, Portugal

Compilation of References ........................................................................................................ 275

About the Contributors .............................................................................................................. 303

Index ........................................................................................................................................ 312