# Table of Contents

## Foreword

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xvi

## Preface

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xix

## Section 1

### Psychology and Serious Games

#### Chapter 1
Psychological Aspects of Serious Games

1

*Elizabeth Boyle, University of the West of Scotland, UK*

#### Chapter 2
Executive Functions in Digital Games

19

*Elizabeth Boyle, University of the West of Scotland, UK*

*Melody M. Terras, University of the West of Scotland, UK*

*Judith Ramsay, University of the West of Scotland, UK*

*James M. E. Boyle, University of Strathclyde, UK*

#### Chapter 3
The Road to Critical Thinking and Intelligence Analysis

47

*Michel Rudnianski, ORT, France*

*Milos Kravcik, RWTH Aachen University, Germany*

#### Chapter 4
Time Factor Assessment in Game-Based Learning: Time Perspective and Time-on-Task as Individual Differences between Players

62

*Mireia Usart, Universitat Ramon Llull (ESADE), Spain*

*Margarida Romero, Universitat Ramon Llull (ESADE), Spain*
Chapter 5
Neurofeedback and Serious Games ................................................................. 82
Manuel Ninaus, University of Graz, Austria
Matthias Witte, University of Graz, Austria
Silvia E. Kober, University of Graz, Austria
Elisabeth V. C. Friedrich, University of Graz, Austria
Jürgen Kurzmann, University of Graz, Austria
Erwin Hartsuiker, Mind Media BV, The Netherlands
Christa Neuper, University of Graz, Austria & Graz University of Technology, Austria
Guilherme Wood, University of Graz, Austria

Chapter 6
Disrupting the Magic Circle: The Impact of Negative Social Gaming Behaviours .................. 111
Bernd Remmele, Wissenschaftliche Hochschule Lahr, Germany
Nicola Whitton, Manchester Metropolitan University, UK

Chapter 7
Non-Player Characters and Artificial Intelligence .............................................. 127
Gonçalo Pereira, INESC-ID, Portugal and Instituto Superior Técnico, University of Lisbon, Portugal
António Brisson, INESC-ID, Portugal and Instituto Superior Técnico, University of Lisbon, Portugal
João Dias, INESC-ID, Portugal and Instituto Superior Técnico, University of Lisbon, Portugal
André Carvalho, INESC-ID, Portugal and Instituto Superior Técnico, University of Lisbon, Portugal
Joana Dimas, INESC-ID, Portugal and Instituto Superior Técnico, University of Lisbon, Portugal
Samuel Mascarenhas, INESC-ID, Portugal and Instituto Superior Técnico, University of Lisbon, Portugal
Joana Campos, INESC-ID, Portugal and Instituto Superior Técnico, University of Lisbon, Portugal
Marco Vala, INESC-ID, Portugal and Instituto Superior Técnico, University of Lisbon, Portugal
Iolanda Leite, INESC-ID, Portugal and Instituto Superior Técnico, University of Lisbon, Portugal
Carlos Martinho, INESC-ID, Portugal and Instituto Superior Técnico, University of Lisbon, Portugal
Rui Prada, INESC-ID, Portugal and Instituto Superior Técnico, University of Lisbon, Portugal
Ana Paiva, INESC-ID, Portugal and Instituto Superior Técnico, University of Lisbon, Portugal

Chapter 8
Individual Differences in the Enjoyment and Effectiveness of Serious Games ..................... 153
Dawn G. Blasko, Pennsylvania State University, USA
Heather C. Lum, Pennsylvania State University, USA
Matthew M. White, Pennsylvania State University, USA
Holly Blasko Drabik, University of Central Florida, USA

Chapter 9
Rhetoric of Play: Utilizing the Gamer Factor in Selecting and Training Employees.................. 175
Ben Tran, Alliant International University, USA
Chapter 10
Games and Social Networks ................................................................. 204
Yulia Bachvarova, Cyntelix, The Netherlands
Stefano Bocconi, Cyntelix, The Netherlands

Section 2
Pedagogy and Assessment

Chapter 11
What is the “Learning” in Games-Based Learning? ........................................ 221
Karen Orr, Queen’s University Belfast, Northern Ireland
Carol McGuinness, Queen’s University Belfast, Northern Ireland

Chapter 12
Games for and by Teachers and Learners .................................................. 243
Peter van Rosmalen, Open University of The Netherlands, The Netherlands
Amanda Wilson, University of the West of Scotland, UK
Hans Hummel, Open University of The Netherlands, The Netherlands

Chapter 13
A Randomised Controlled Trial to Evaluate Learning Effectiveness Using an Adaptive Serious Game to Teach SQL at Higher Education Level ................................................................. 270
Thomas Hainey, University of the West of Scotland, UK
Mario Soflano, University of the West of Scotland, UK
Thomas M. Connolly, University of the West of Scotland, UK

Chapter 14
The Quest for a Massively Multiplayer Online Game that Teaches Physics ......................... 292
Ricardo Javier Rademacher Mena, Futur-E-Scape, LLC, USA

Chapter 15
Assessment Integration in Serious Games ................................................... 317
Thomas Hainey, University of the West of Scotland, UK
Thomas M. Connolly, University of the West of Scotland, UK
Yaëlle Chaudy, University of the West of Scotland, UK
Elizabeth Boyle, University of the West of Scotland, UK
Richard Beeby, University of the West of Scotland, UK
Mario Soflano, University of the West of Scotland, UK

Chapter 16
A Case for Integration: Assessment and Games ........................................... 342
Alex Moseley, University of Leicester, UK
Chapter 17
A Brief Methodology for Researching and Evaluating Serious Games and Game-Based Learning

Igor Mayer, Delft University of Technology, The Netherlands
Geertje Bekebrede, Delft University of Technology, The Netherlands
Harald Warmelink, Delft University of Technology, The Netherlands
Qiqi Zhou, Delft University of Technology, The Netherlands

Chapter 18
Study Design and Data Gathering Guide for Serious Games’ Evaluation

Jannicke Baalsrud Hauge, Bremer Institut für Produktion und Logistik (BIBA), Germany
Elizabeth Boyle, University of the West of Scotland, UK
Igor Mayer, Delft University of Technology, The Netherlands
Rob Nadolski, Open University of The Netherlands, The Netherlands
Johann C. K. H. Riedel, Nottingham University, UK
Pablo Moreno-Ger, Universidad Complutense de Madrid, Spain
Francesco Bellotti, Università degli Studi di Genova, Italy
Theodore Lim, Heriot-Watt University, UK
James Ritchie, Heriot-Watt University, UK

Compilation of References

About the Contributors

Index