

Contents

Preface ix

Acknowledgments xiii

I Introduction to Game-Based Learning

1 Theoretical Foundations of Game-Based and Playful Learning 3

Jan L. Plass, Bruce D. Homer, Richard E. Mayer,
and Charles K. Kinzer

2 Games as Playful Learning: Implications of Developmental Theory for Game-Based Learning 25

Bruce D. Homer, Charles Raffaele, and Hamadi Henderson

3 Types of Engagement in Learning with Games 53

Ruth N. Schwartz and Jan L. Plass

II Theoretical Foundations of Game-Based Learning

4 Cognitive Foundations of Game-Based Learning 83

Richard E. Mayer

5 Emotional Foundations of Game-Based Learning 111

Kristina Loderer, Reinhard Pekrun, and Jan L. Plass

6 Motivational Foundations of Game-Based Learning 153

Richard M. Ryan and C. Scott Rigby

7 Sociocultural Foundations of Game-Based Learning 177

Constance Steinkuehler and A. M. Tsaasan

III Design Foundations of Game-Based Learning

8 Instructional Support, Feedback, and Coaching in Game-Based Learning 209
James C. Lester, Randall D. Spain, Jonathan P. Rowe, and Bradford W. Mott

9 Self-Regulation and Reflection during Game-Based Learning 239
Michelle Taub, Roger Azevedo, Amanda E. Bradbury, and Nicholas V. Mudrick

10 Adaptivity and Personalization in Game-Based Learning 263
Jan L. Plass and Shashank Pawar

11 Narrative in Game-Based Learning 283
Michele D. Dickey

12 Multimedia Design Principles in Game-Based Learning 307
Brian Nelson and Younsu Kim

13 Collaboration and Competition in Game-Based Learning 329
Fengfeng Ke

14 Emerging Design Factors in Game-Based Learning: Emotional Design, Musical Score, and Game Mechanics Design 347
Shashank Pawar, Frankie Tam, and Jan L. Plass

15 Emerging Design Factors in Game-Based Learning: Incentives, Social Presence, and Identity Design 367
Frankie Tam and Shashank Pawar

IV Applications of Game-Based Learning

16 Game-Based Learning in Science, Technology, Engineering, and Mathematics 387
Eric Klopfer and Meredith Thompson

17 Digital Games as Language-Learning Environments 409
Jonathon Reinhardt and Steven L. Thorne

18 Games for Enhancing Cognitive Abilities 437
Pedro Cardoso-Leite, Augustin Joessel, and Daphne Bavelier

19 Games for Workforce Learning and Performance 469
Ruth Clark and Frank Nguyen

20 Games for Assessment 491
Valerie J. Shute and Chen Sun

Part 21 Learning Analytics for Games 513

V. Elizabeth Owen and Ryan S. Baker

Contributors 537

Author Index 541

Subject Index 571

Objective

Can you learn academic content or skills by playing computer games? If so, what is the best way to design computer games so they maximize your learning? How does game-based learning work? These are the kinds of questions addressed in *Handbook of Game-Based Learning* for the purposes of this handbook, game-based learning refers to academic learning from playing computer games (also called video games or digital games). If you are interested in what research has to say about game-based learning, then this handbook is for you.

The goal of this handbook is to give you a comprehensive introduction to research on learning and instruction with computer games. Concerning learning, it explores research on whether and how different game types help students learn academic content (such as in science, mathematics, or history) and academic skills (such as how to keep your attention focused on the key material). Concerning instruction, it explores research on which game features (such as feedback, coaching, or adaptivity) can improve the instructional effectiveness of computer games. In short, the goal of the handbook is to help establish a solid empirical and theoretical foundation for the discipline of game-based learning that synthesizes and organizes existing research and sets a research agenda for years to come.

Description

Handbook of Game-Based Learning is a comprehensive volume summarizing research and theory in the field of game-based learning. Our approach to understanding the empirical and theoretical foundations of game-based learning is that no single perspective alone can suffice. Instead, the volume includes cognitive, motivational, affective, and sociocultural perspectives. In doing so, it is the first comprehensive volume describing how people learn from digital game-based environments. The chapters are