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Gaming and Simulations: Concepts, Methodologies, Tools and Applications

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Preface

Simulation and gaming is a promising, and rapidly-expanding, field of study. This new methodology is being adopted in a wide variety of disciplines. Complicated computer models have helped inform everything from finance to engineering, a new wave of “serious games” have begun to change the way we think about gaming as a tool for learning, and true-to-life simulations have changed the way professionals train for intensive, on-the-job skills.

The research on simulations and gaming is constantly changing, making it challenging for experts and practitioners to stay informed 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 gaming and simulation by providing both broad and detailed perspectives on cutting-edge theories and developments. This reference is designed to act as a single reference source on conceptual, methodological, technical, and managerial issues, as well as provide insight into emerging trends and future opportunities within the discipline.

Gaming and Simulations: Concepts, Methodologies, Tools and Applications is organized into eight 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) Organizational and Social Implications, (6) Managerial Impact, (7) Critical Issues, and (8) Emerging Trends. The following paragraphs provide a summary of what to expect from this invaluable reference tool.

Section 1, ***Fundamental Concepts and Theories***, serves as a foundation for this extensive reference tool by addressing crucial theories essential to the understanding of gaming and simulation. Chapters such as *An Overview of Gaming Terminology* by Clark Aldrich and Joseph DiPietro, and *Mobility, Games, and Education* by Michael A. Evans give an introduction and overview of gaming and simulation. *Video Games Revisited* by Patricia M. Greenfield revisits a landmark piece of scholarship originally written in 1994. Additional selections, including *The Path between Pedagogy and Technology* by Colin Price, and *Simulation in Teaching and Training* by Alke Martens focus on providing backgrounds and introductions to specific concepts within gaming and simulations. These and several other foundational chapters provide a wealth of expert research on the elemental concepts and ideas surrounding gaming and simulation.

Section 2, ***Development and Design Methodologies***, presents in-depth coverage of the conceptual design and architecture of games and simulations, focusing on aspects of learning and game design. Designing and implementing effective processes and strategies are the focus of such chapters as *Communicability in Educational Simulations* by Emma Nicol, and *Considerations and Methodology for Designing a Virtual World* by Brian Bauer. *Combining Instructional Design and Game Design* by Celina Byers discusses the benefits of combining elements of game design and instructional design by applying recent findings in cognitive psychology. With contributions from leading international researchers, this section offers copious developmental approaches and design methodologies for games and simulations.

Section 3, ***Tools and Technologies***, presents extensive coverage of the various tools and technologies used in the development of games and simulation. This comprehensive section includes such chapters as *An Intelligent Web-Based Human-Computer Interaction System with Natural Language CSIEC and its Integration into English Instruction*, by Jiyoun Jia, and *Design Principles for Interactive Learning Environments with Embedded Formative Assessments* by Sara Dexter, which describe various techniques and models for interactive learning systems. *Design and Evaluation of Embodied Conversational Agents for Educational and Advisory Software* by Elisabeth André provides guidelines and approved methods for the development of animated pedagogical agents. Finally, chapters such as *Hybrid 2D/3D Development of Interactive Simulations* by Penny deByl, and *Information and Visualization Imagery* by Shalin Hai-Jew presents research on digital simulations and imagery. In all, this section provides coverage of a variety of tools and technologies that inform and enhance modern research in gaming and simulations.

Section 4, ***Utilization and Application***, describes how games and simulations have been utilized and offers insight on important lessons for their continued use and evolution. Including chapters such as *Applied Training in Virtual Environments* by Ken Hudson and *Educational Gaming Avatars* by Colette Wanless-Sobel, this section investigates numerous methodologies that have been proposed and enacted in gaming and simulations, as well as their results. This section continues with a number of chapters exploring neural networks such as *Synchronization of Uncertain Neural Networks with performance and Mixed Time-Delays* by Hamid Reza Karimi and *Neural Network-Based Process Analysis in Sport* by Juergen Perl. Contributions found in this section provide comprehensive coverage of the practicality and current use of games and simulations.

Section 5, ***Organizational and Social Implications***, includes chapters discussing the organizational and social impact of gaming and simulation. *Culturally Responsive Games and Simulations* by Colleen Swain introduces the reader to the connection between culture and learning. *Fear of Flying and Virtual Environments* by Giovanni Vincenti examines how computer simulations can be used to treat patients suffering from phobias. *Simulation Technologies in Global Learning* by Robert Tennyson focuses on the role that simulations can provide in both the effectiveness and efficiency of training and education. This section continues with *The Application of 'Activity Theory' in the Design of Educational Simulation Games* by Paul Peachey, which offers suggestions as to how activity theory may be used in the design of computer simulation games directed at education. Overall, these chapters present a detailed investigation of the complex relationship between individuals, organizations and simulations.

Section 6, ***Managerial Impact***, presents focused coverage of gaming and simulations as it relates to improvements and considerations in the workplace. *Managerial Computer Business Games* by Luigi Proserpio investigates managerial learning through business games. Other chapters such as *The State of Computer Simulation Applications in Construction* by Mohamed Marzouk present an overview of computer simulation efforts that have been performed in the area of construction engineering and management. In all, the chapters in this section offer specific perspectives on how managerial perspectives and developments in games and simulations inform each other to create more meaningful user experiences.

Section 7, ***Critical Issues***, addresses vital issues related to gaming and simulations, which include customer relationship management, critical success factors and the business strategies. Chapters such as *A Qualitative Meta-Analysis of Computer Games as Learning Tools* by Fengfeng Ke, and *An Investigation of Current Online Educational Games* by Yufeng Qian discuss the success of educational games based on technology, people, and processes. Additional selections, such as *Building Interactive and Immersive Imagery* by Shalin Hai-Jew, *Making a Connection* by Dennis Charsky, and *Mitigating Negative Learning in Immersive Spaces and Simulations* by Shalin Hai-Jew address critical success factors in the deployment of games and simulations.

Section 8, ***Emerging Trends***, highlights areas for future research within the field of gaming and simulations, while exploring new avenues for the advancement of the discipline. Beginning this section

is *Knowledge Engines for Critical Decision Support* by Richard M. Adler which argues that tacit strategic performance-based knowledge can often be captured and deployed effectively, via frameworks that combine scenario planning methods with “what-if” simulation. Language Simulations *are* presented in *Language Simulations for Fostering Language Acquisition and Communicative Competence in Adult Second- Language Learners* by Angelene McLaren, and *Synthetic Biology as a Proof of Systems Biology* by Andrew Kuznetsov explores the merits of combining systems and synthetic biology. These and several other emerging trends and suggestions for future research can be found within the final section of this exhaustive multi-volume set.

Although the primary organization of the contents in this multi-volume work is based on its eight sections, offering a progression of coverage of the important concepts, methodologies, technologies, applications, social issues, and emerging trends, the reader can also identify specific contents by utilizing the extensive indexing system listed at the end of each volume. Furthermore to ensure that the scholar, researcher and educator have access to the entire contents of this multi volume set as well as additional coverage that could not be included in the print version of this publication, the publisher will provide unlimited multi-user electronic access to the online aggregated database of this collection for the life of the edition, free of charge when a library purchases a print copy. This aggregated database provides far more contents than what can be included in the print version in addition to continual updates. This unlimited access, coupled with the continuous updates to the database ensures that the most current research is accessible to knowledge seekers.

As a comprehensive collection of research on the latest findings related to using technology to providing various services, *Gaming and Simulations: Concepts, Methodologies, Tools and Applications*, provides researchers, administrators and all audiences with a complete understanding of the development of applications and concepts in gaming and simulations. Given the vast number of issues concerning usage, failure, success, policies, strategies, and applications of gaming and simulations in organizations, *Gaming and Simulations: Concepts, Methodologies, Tools and Applications* addresses the demand for a resource that encompasses the most pertinent research in gaming and simulations development, deployment, and impact.

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This section serves as the foundation for this exhaustive reference tool by addressing crucial theories essential to the understanding of games and simulations. Chapters found within these pages provide an excellent framework in which to position gaming and simulations within the field of information science and technology. Individual contributions provide overviews of the history of gaming and simulations, the impact of information systems on organizations, and overviews on various games and simulation processes. Within this introductory section, the reader can learn and choose from a compendium of expert research on the elemental theories underscoring gaming and simulation.

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