Preface

INTRODUCTION

Video games and digital experiences have come to have an important place in modern society. Game experiences have become ubiquitous. Games have been adapted for enhancing productivity tools, customer experiences, marketing, communication, teaching and learning, data collection, and even medical interventions. Games are still games, and thanks to computers and communications infrastructure, we can now experience a wide variety of gaming experiences with a great variety of content, purpose, and participation. Articles in these sections present insight and exploration, extending what we know about games, gamification, and simulations. This collection is drawn from articles selected as enhanced, top-articles published in a leading, peer-reviewed journal.

This preface begins with a brief background about the journal, and then provides an overview and summary of the 14 chapters in this book. The book is organized in three sections by theme: User Research, Learning Applications, and Health Enhancement. Each section is briefly defined, and each chapter is given an overview related to that section theme. This preface concludes with some recommendations and goals for future research, policy, and practice.

IJCMS

The International Journal of Games and Computer-Mediated Simulations (IJGCMS) was launched in 2009 (http://www.igi-global.com/ijgcms). The journal is devoted to the theoretical and empirical understanding of electronic games and computer-mediated simulations. The journal is interdisciplinary in nature; it publishes research from fields and disciplines that share the goal of improving the foundational knowledge base of games and simulations. The journal publishes critical theoretical manuscripts, qualitative and quantitative research studies, meta-analyses, worked examples, industry post mortems on product research and implementation for development, and methodologically sound case studies.

The journal also includes book reviews to keep readers on the forefront of this continuously evolving field. Occasional special issues from the journal provide deeper investigation into areas of interest within either gaming or simulations.

The main goal of this peer-reviewed, international journal is to promote a deep conceptual and empirical understanding of the roles of electronic games and computer-mediated simulations across multiple disciplines. A second goal is to help build a significant bridge between research and practice on electronic gaming and simulations, supporting the work of researchers, practitioners, and policymakers.

In the following paragraphs, the editorial policy of IJCMS, and five guiding principles are presented.
Principle 1: Quality and Rigor in Content and Review

The first important principle is. IJGCMS follows a double-blind review process to ensure anonymity and a fair review. The review process is intended to be critical, but helpful and instructive. We want the journal to provide high-value function, positive emotional experience, and potentially, transformation, and social impact.

Research articles that are published may contain either quantitative or qualitative data collection and analyses. However, articles using either method must present data to support and justify claims made within the article. Articles that simply summarize data without presenting it or the analytical techniques used, are not considered.

Theoretical manuscripts are also published. However, these theoretical reviews must create new knowledge by synthesizing and critiquing past research. Simple summaries of existing literature without thoughtful and considerate analyses are not considered.

Principle 2: Interdisciplinary Focus

IJGCMS seeks to publish about games and simulations within and across the numerous fields and disciplines that undertake research related to games and simulations. Psychology, Education, History, Journalism, Literature, Computer Science, Engineering, Fine Arts, and Medicine are just a few of the areas where one could find gaming and simulation research. Unfortunately, in academia, the notion of standing on the shoulders of giants has implied an historical perspective, but often only within the well-defined academic fiends. There are often well-defined boundaries, useful for maintaining traditions, and content-domain-specific concepts and methods. The journal seeks to celebrate history and progress. This is an important part of moving the field forward. But the journal is intended to cross traditional boundaries, and include parallel work in other fields to address and explore the complex natures of games and simulations.

IJGCMS publishes articles from any discipline as long as the content of the work is related to games and simulations. Including multiple fields helps researchers recognize their similarities as well as introducing them to colleagues from distinctly different backgrounds.

Principle 3: International Contributions

A third principal of this journal is its international focus. The journal editorial board seeks and recruits scholars to represent different international perspectives on the Editorial Board of IJGCMS. Having diverse, international perspectives provides two interesting opportunities. First, readers are able to see how researchers from various countries conduct and report scientific inquiry, and their interests on games and simulations. For example, what are the current inquiries and interests on games in various countries around the world?

Principle 4: Innovation

Gaming and simulation researchers often create new concepts, new methods, new implementation, and new technologies in their work. IJGCMS is a journal where authors who create new approaches can publish their findings. IJGCMS is also a resource for readers who want to keep up with the latest and
most cutting edge technologies. Special, focused issues with guest editors promote new insights; connect readers with new ideas, new researchers, and new topics for in-depth analyses of conceptual or technological innovations. As part of the journal mission, proposals for special issues are welcomed at any time.

**Principle 5: Implication for Practice and Theory**

Research should inform theory and application. We seek the betterment of humanity. Our intent to provide some improvement in whatever means possible: entertainment, research methods, our interactions with contributors and readers; we seek to examine and share cultural issues ranging from gender bias and misogyny, cultural diversity, and representation (or the lack thereof) as race, age, and gender. Games and entertainment have much to teach us about our society, and provide a mirror report on our culture. How we play and what we seek for entertainment can be indicative of our cultural values.

Developing a strong research foundation for games and simulations is important, but only to the extent that the research provides a positive impact. We ask our reviewers directly:

- “What are the implications of this work on other research, policy, and practice?”

Recommended topics for the journal include (but are not limited to) the following:

- User research: Psychological aspects of gamers
- Cognitive, social, and emotional impact of games and simulations
- Critical reviews and meta-analyses of existing game and simulation literature
- Current and future trends, technologies, and strategies related to game, simulation development, and implementation
- Electronic games and simulations in government, business, and the workforce
- Electronic games and simulations in teaching and learning
- Frameworks to understand the societal and cultural impacts of games and simulations
- Impact of game and simulation development use on race and gender game and simulation design
- Innovative and current research methods and methodologies to study electronic games and simulations
- Teaching of games and simulations at multiple age and grade levels
- Medical usage of games for clinical assessment and intervention
- Postmortems on game development

Additionally, IJGMCS partners with academic and professional conferences. A tremendous amount of cutting-edge research in games and simulations is first presented at conferences. In an attempt to capture these findings, IJGCMS often partners with conferences and organizations to create special issues focused on the leading research from conferences including the Meaningful Play Conference, Serious Games Conference, Ludica Medica, and the American Education Research Association (AERA) Games Special Interest Group.

This book includes top articles from four regular issues, and four special issues. The special issue topics were:
Gamification, Serious Games, and Ludic Simulations
Teacher Education
HFACS (Human Factors Analysis and Classification System)
Ludica Medica, a special issue drawn from the Games for Health Conference subgroup called, which specialized on Health Care simulations.

The IJGCMS’ editorial board consists of four separate groups (http://www.igi-global.com/ijgcms).

1. The international advisory board consists of a panel of leading experts from around the world. The advisory board provides insight and helpful recommendations to the editor; they are also available for suggestions and recommendations of future journal goals and special issues.
2. IJGCMS has a panel of associate editors. Each submission goes to one associate editor. Having a smaller number of associate editors has provided a way to maintain consistency in reviews.
3. Each submission receives three double blind, peer reviews. The associate editor and the editorial review board members are matched as closely as possible based on the topic of the submission and the expertise of the reviewer. However, the reviews are double blind. In other words, the authors do not know the identity of the reviewers assigned to their paper, nor do the reviewers know the author.
4. The fourth group is a panel of co-book review editors who help select books, solicit reviewers, and edit reviews. IJGCMS publishes a book review with almost every issue.

Journal special issues are also peer-reviewed. This can be done in a number of different ways. Often, for conference special issues, submissions are reviewed once at the submission stage, where they are accepted or rejected for presentation. Accepted papers are then offered the chance to submit for journal submission, where they are again reviewed either by the conference review panel or IJGCMS’ own review board.

The four issues for 2012 and 2013 produced a total of 46 peer-reviewed papers. The editorial board selected fourteen articles as the top articles. Upon selection the authors were given the opportunity to update their paper with new data, new findings, or related articles since the original publication of their paper. The purpose and goal of this book is to highlight the work of those authors, presenting findings that will impact the field of gaming and simulations in multiple ways.

The book itself is divided into three themes sections:

- Section 1: User Research
- Section 2: Learning Applications
- Section 3: Health Enhancement

It should be noted that the purpose of this summary is to highlight the main ideas. It is not intended to take away from the rich insights or deep conversations included in each chapter. For instance, one of the goals of IJGCMS is to publish articles that directly impact policy, research, and practice. Each chapter in this book contains a rich description of the ‘so what?’ for those working in various fields. A thorough reading of each chapter will provide such detailed information.
SECTION 1: USER RESEARCH

User research focuses on understanding user behaviors, needs, and motivations through observation techniques, task analysis, and other feedback methodologies. In 2013 and 2014, there were five articles selected that develop around the theme of user research.

Chapter 1: Quantifying “Magic” – Learnings from User Research for Creating Good Player Experiences on Xbox Kinect

In our first chapter, Drs. Fisher, Nichols, Ibister, and Fuller offer insight into their work as part of the Microsoft Studios User Research (SUR) team, and their role in creating the first full-body gaming experiences for the Kinect system. They describe outcomes of internal research for the development of Kinect, describing the method and practice SUR has created for working with game designers, programmers, and hardware developers on games and other applications that use Kinect.

Chapter 2: Gamification Transformed – Gamification Should Deliver the Best Parts of Game Experiences, Not Just Experiences of Game Parts

In the second chapter the author presents a new perspective on gamification. The article proposes that gamification should deliver the best parts of game experiences, not just experiences of game parts. The chapter examines commonly held views that gamification is the use game elements used in a non-game context, often to amplify a user’s engagement in an activity that may be tedious or repetitious. The problem with this definition is that it does not define which game elements that make for great experiences.

The author presents three game models predicated upon the experience of the user. Where Grind Core and Freemium games rely heavily on compulsion loops, the Immersion model is constructed around reward action contingencies. These three experiential models are compared to examine potential to deliver value across four categories: function, emotion, life changing, and social impact.

Chapter 3: The Effects of Avatar-Based Customization on Player Identification

In article three, Drs. Turkay and Kinzer explore the way that games allow players to perceive themselves in alternate ways in imagined worlds. This mixed method study aims to examining the effects of avatar-based customization on players’ identification and empathy with their characters in a massively multiplayer online game, Lord of the Rings Online (LotRO). The authors use Self-Determination Theory to interpret results and found that avatar-based customization positively impacted players’ identification with their avatars, and had significant influence on player behavior. Through avatars, games allow players to explore themselves in alternate ways in imagined worlds. They explain that player identification with an avatar—how the player is represented—as an important part of gameplay experience, and how it affects player enjoyment.
Chapter 4: An Experiment on Anonymity and Multi-User Virtual Environments – Manipulating Identity to Increase Learning

The fourth article in the section was an experimental study that compared the effect of having students hold a discussion though a multi-user virtual environment (MUVE; OpenSim) vs. a chat room and whether these discussions were anonymous or not. Their results and discussion provide valuable context for researchers and educators to use in considering when and how to use MUVEs and features of (e.g., anonymity). More generally, Landers and Callan’s research emphasizes that MUVE environments require an abundance of context-sensitive and descriptive empirical research to help identify best use, and the boundaries of their use.

Chapter 5: Digital Divide – Comparing the Impact of Digital and Non-Digital Platforms on Player Behaviors and Game Impact

In Chapter 5, authors Kaufman and Flannagan examine whether transferring a board game from an analog to a digital format would impact players’ perceptions of the game and still be as effective in changing player beliefs about the role of vaccines. Small changes in game presentation were accounted for, yet players reported that playing the same game, when the game board was presented on a digital tablet made the game more complex. Studies of how small changes can yield markedly different user experience are important for understanding development and design issues in the creation and implementation of games. The authors propose several explanations for this finding, including follow-up work demonstrating the impact of platform on basic cognitive processes, to help elucidate critical distinctions between digital and non-digital game play experience and impact.

SECTION 2: LEARNING APPLICATIONS

In Section 2, the theme of learning applications provides research on the use of games and simulations for training and learning in a variety of educational contexts, ranging from children in science and mathematics classrooms, to adults in medical school. These chapters look at the potential for using computer games and simulations to enhance learning through interactive content.

Chapter 6: Making Lifelike Medical Games in the Age of Virtual Reality – An Update on “Playing Games with Biology”

In Chapter 6, the author addresses this question “How much fidelity is really necessary in a medical simulation?” by presenting a rich review of best-case scenarios for efficacy of realism, immersion, and narrative. In medical education, high fidelity is important for training practitioners to care for people. This is because the learning that happens in games must result in better-prepared doctors, nurses, caregivers, and responders. In some situations, this training could make the difference in someone’s life. This chapter provides insight on simulating biological processes for medical training and education.
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Chapter 7: Using Serious Gaming to Improve the Safety of Central Venous Catheter Placement – A Post-Mortem Analysis

In Chapter 7, Katz, Goldberg, Khanal, Kahol, and DeMaria provide a post-mortem, describing the need, process, and development of a serious game for medical training. They describe the need for a realistic and highly interactive simulated environment; so medical students can learn not only psychomotor skills (e.g., lumbar puncture, endotracheal intubation), but also key management and non-technical steps, which make their tasks safer. Their game trains in the placement of central venous catheter (CVC). The chapter provides an examination of the challenges encountered while designing and executing their serious game as medical research. Evaluation of the CVC game showed the game to be an effective teaching tool, and the authors provide insight for similar projects in the future.

Chapter 8: Making Learning Fun – An Investigation of Using a Ludic Simulation for Middle School Space Science

Chapter 8 provides observations on the use of ludic simulations for middle school space science instruction. They present a brief overview of previous research on simulation and then explore some intricacies of students’ ludic experiences within it. The purpose of the chapter is to better understand the value of ludic simulations in education. Play is an organizing principle in ludic simulation.

Unlike true simulations, which would replicate a system with absolute fidelity and realism, ludic simulations hold ludic (playful) activity to be as important as fidelity or realism. They offer observations of student experiences with ludic simulations for engagement and education rigor.

SECTION 3: HEALTH ENHANCEMENT AND CLINICAL INTERVENTION

Section 3 provides six chapters covering topics such as childbirth education, sports therapy for rehabilitation and enhancement of vision, and improving cognition for healthy aging for the elderly and for children. These chapters are followed by a meta-analysis on the effectiveness for using games to improve physical fitness, and a case study, which provides insights into building a business case for using games and artificial intelligence for medical services and data collection.

Chapter 9: Teaching Childbirth Support Techniques Using the Prepared Partner and Digital Birth – The Design and Development of Games for Dads-to-Be

Chapter 9 provides insight into user research methods that inform the development of a serious game to prepare first-time parents for childbirth. Ethnography was used in a mixed-methods approach, which included interview, observation, and survey techniques to document the practice of childbirth preparation. The data collected was used to construct software requirements to inform the game design. Prepared Partner was developed as an online Flash game, and Digital Birth, was developed as a free iPhone application. Both games are described as tools to help birth parents prepare for supportive actions and behavior in labor in birthing. Outcomes in the analysis indicated that the games were effective in helping players meet learning goals for birth preparation, and players reported enjoyment in playing the games.
Chapter 10: Beyond Gaming – The Utility of Video Games for Sports Performance

In Chapter 10, the authors created a game to look at the potential to improve vision with a video game. They grounded their study in vision research, building their variables around the psychophysics of vision. Specifically, they target research that has shown that repetitive stimulation of the parvocellular system shows promising preliminary results in improving vision related to batting performance in baseball. To examine this, they embedded a homerun derby style baseball game with a contrast threshold test, to stimulate parvocellular retinal ganglion cells.

Chapter 11: Games and Other Training Interventions to Improve Cognition in Healthy Older Adults

In Chapter 11, the author presents a review offering insight into how games may be used to help older populations maintain independence and autonomy through improving cognition. Dr. Zelinsky makes the case that games and exercises can serve as interventions for healthy aging, and provides specific areas that need to be researched to fulfill that promise.

Chapter 12: Computer-Presented and Physical Brain-Training Exercises for School Children – Improving Executive Functions and Learning

In Chapter 12, Bruce Wexler of Yale University examines academic and cognitive outcomes in a study of C8 games, which were developed to examine the use of video games for improvements in attention, executive function, and their relationship to the academic performance of elementary school children. The article, “Integrated Brain and Body Exercises” presents the neuroscience foundation for understanding and enhancing performance, as well as study outcomes, which offer insight into cognitive training, diagnostic feedback, and the value of informing each child of their cognitive strengths and weaknesses. The training outcomes were then related to improved academic outcomes for elementary children in two schools.

Chapter 13: Promoting Physical Activity and Fitness with Exergames – Updated Systematic Review of Systematic Reviews

In Chapter 13, a systematic review is provided to offer insights and precedent. With the increase in new media, there is also a significant decrease in the level of physical activity in people. The purpose of this chapter is to answer the following research questions: (1) What levels of exertion are typical for exergaming? (2) Can exergaming contribute to increasing physical activity? (3) Can exergaming be used to increase physical fitness? This study also identifies relevant gaps in previous research and gives recommendations for future studies.
Chapter 14: Is Artificial Intelligence (AI) Friend or Foe to Patients in Healthcare? On Virtues of Dynamic Consent – How to Build a Business Case for Digital Health Applications

In Chapter 14, the author presents a process for developing a business model. This is done with examples and best practice through a case study called the Home Assessment Tool (HAT). To understand, design, and implement, she describes a method called the Patient Journey Mapping. This technique is used for tracking and gaining insights into consumers’ day-to-day experiences, i.e. the full complexity of their decisions regarding aging-related cognitive change.

CONCLUSION

The work that has been published on games and simulations in IJGCMS is continuing to advance research, policy, practice, and improve people’s lives. In conclusion, one could ask, what can we learn about the current state of the field from these 14 publications? Listed below are some of the key findings from each of these studies:

1. User experience research is essential in game development. Developers need research data to understanding the user for the design, development, and implementation of software as games and simulations.
2. Digital games and simulations exist in many forms, but those that provide high-value experiences to the user are more likely to lead to optimal experience. These experiences are built upon delivering intuitive functionality, positive emotional tone, and personal transformation, resulting in trust and loyalty in customers, leading to social impact.
3. There is a difference between making a difficult game, and a challenging game. Challenging games have activities that can be overcome in the flow of game play, difficult activities must be overpowered – to do this the player leaves the focus and flow of the game. 
4. Software, products, and services should look beyond enhancing tedious activities with parts of games, and consider how to deliver the best experiences that games offer.
5. Avatar creation and play creates self-exploration and provides the potential for life-changing experience.
6. Gamification and the use of MUVES require an abundance of context-sensitive and descriptive empirical research that identifies the boundaries of their use and replicates findings.
7. Small differences in game presentation can alter the beliefs and approach to a game experience. Platform and presentation provide a demonstrable difference in response in basic cognitive processes between digital and non-digital game play experience and impact.
8. Games can increase contact and accessibility for sharing important information, and learning about life transitions.
9. Games for medical education and training should be planned based upon how much fidelity is necessary.
10. Game and simulation designers can improve learning outcomes by considering the interaction and representation– not just the content. In well-designed games and gamification, the interaction is the content.
11. Consistency, feedback, and the appropriate use of representations through game interfaces can positively impact user learning and cognitive development.
12. Games and game-play can be used as hooks to help students then help students understand and explore real-world rites of passage.
13. Play is an important part of learning content in simulations and gaming. The ability to practice and explore can be signaled through design and provide a playful approach. Play can increase motivation in academic learning.
14. Simulations can be playful (ludic) and fun. Students who are unmotivated to participate and engage in learning often change their mind when presented with playful, game-like experiences.
15. Games have the potential to provide complex experiences to present a new frontier in cognitive aging and quality of life
16. Physical behavior aligned with digital game play can be motivating, and potentially lead to cognitive enhancement, improved academic learning, and improved well-being
17. New digital delivery systems can help improve physical health outcomes through data collection and artificial intelligence to inform the individual user for behavioral modification, as well as provide broader patterns for institutional insights to provide broader health care initiatives.

Brock Dubbels
McMaster University, Canada