Preface

INTRODUCTION

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 as well as qualitative and quantitative research studies, meta-analyses, 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.

This is the second book in a series that sets out to capture the important findings and best practices of the journal articles that were published in IJGMCS over an entire year of publication. This is not meant to be a handbook of everything that has been written about games and simulations. On the contrary, this tome was created to highlight the work that has emerged through a year-long snapshot of articles published in a leading, peer-reviewed journal. This chapter begins with a brief background about the journal (text that is found in our journal mission), and then provides an overview and summary of the 19 chapters in this book. The chapter concludes with some recommendations and goals for future research, policy, and practice.

IJGCMS

One 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.

There are at five guiding principles supporting this mission as well as the editorial policy of IJGCMS. The first important principle is quality and rigor. IJGCMS follows a double-blind review process to ensure anonymity and a fair review. Research articles that are published may contain either quantitative or qualitative data collection & 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. How-
ever, 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.

A second important principle is the notion of IJGCMS as an interdisciplinary journal. There are 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 often meant taken a historical perspective on one’s line of research. Gaining a historical backing is an important part of moving the field forward; however, failing to consider parallel work in other fields is failure to address and accept 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.

In addition to having an interdisciplinary focus, a third principal of this journal is its international focus. There are over 18 countries represented on the Editorial Board of IJGCMS. There is no justifiable reason why our research should have disciplinary OR geographical boundaries. Drawing on work from international authors provides two interesting opportunities. First, readers are able to see one topic from multiple perspectives. For instance, how are researchers from various countries working on science simulations? Second, readers are able to see variations across countries. For instance, what are the current research topics and sets of expertise in various countries around the world?

Innovation is a fourth principle guiding the work of IJGCMS. Gaming and simulation researchers often create new concepts and technologies in their work. IJGCMS is a journal where authors who create new tools and techniques go to publish their findings; it 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 will also promote in-depth analyses at conceptual or technological innovations (proposals for special issues are welcomed at any time).

Finally, IJGCMS is focused on implications. Developing a strong research foundation for games and simulations is important, but only to the extent that the research impacts others. One of the main items reviewers are asked to consider when reviewing for IJGCMS is: “What are the implications of this work on other research, policy, and practice?” Each article author is asked to include direct implications for others working in similar areas, regardless of whether they be researchers, practitioners, or policy-makers.

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

- 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
- Psychological aspects of gaming
- Teaching of games and simulations at multiple age and grade levels
During its second year in press, IJGCMS had two ‘regular’ or general issues and two special issue. Some work in gaming and simulations gets published in journals like IJGCMS. However, a tremendous amount of cutting-edge research in this area 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 the conference. The first special issue for 2010 was from the American Educational Research Association annual conference (http://www.aera.net/), and more specifically papers that were originally accepted to the Applied Research in Virtual Environments for Learning Special Interest Group (ARVEL SIG; http://www.arvelsig.com/). According to the SIG website, the goal of the group is to bring together educators, scholars, and practitioners who are interested in research in and on virtual environments.

The second special issue was from the annual AISB Symposium in AI and Games held in 2009 and 2010. AISB is the Society for the Study of Artificial Intelligence and Simulation of Behavior (http://www.aisb.org.uk/). AI and Games are one of the specific symposia topics under the broader umbrella of AISB. As previously highlighted, IJGCMS prides itself on being an international journal. The first special issue was from a major conference that happens in the United States; the second special issue was led by our international peers in the United Kingdom.

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. Submissions also then go to two editorial review board members. As such, 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. Finally, IJGCMS publishes a book review with almost every issue. The fourth group is a panel of co-book review editors who help select books, solicit reviewers, and edit reviews.

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 2010 produced a total of 19 peer-reviewed papers. In preparing this book, 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.
CHAPTER HIGHLIGHTS

The work that has been published on games and simulations in IJGCMS is continuing to advance research, policy, and practice. In conclusion, one could ask, what can we learn about the current state of the field from these 19 publications? Listed below are some of the key findings from each of these studies (by chapter number).

It should be noted that the purpose of this summary is to highlight some of the main ideas identified in each chapter. 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.

Chapter 1 - Toward a Theory of Game-Media Literacy: Playing and Building as Reading and Writing (Idit Harel Caperton)

- Game literacy is a multidimensional combination of varied practices (e.g., reading, writing, and calculating; textual, visual, and spatial cognition; interactive design, programming, and engineering; multitasking and system understanding; meaning making, storytelling, role playing, perspective taking, and exercising judgment; etc.). (2)
- Researchers offer solid evidence that children learn important content, perspectives, and vital 21st-century skills from playing digital games. (3)
- In other words, while ‘systems content’ may be more or less present and conveyed through game play, working on game creation arguably conveys understanding of game components and game systems through a more intimate and interdependent epistemological context... game-playing is like “reading” and game-making is like “writing” in that they must be introduced to learners hand-in-hand from a young age. (9)
- In a world in which the ability to imagine, represent and create, not just consume, digital media will define citizenship, measure productivity, and enable success, students can afford no less. (13)

Chapter 2 - Narratizing Disciplines and Disciplinizing Narratives: Games as 21st Century Curriculum (Sasha A. Barab, Melissa Gresalfi, Tyler Dodge, & Adam Ingram-Goble)

- We are primarily interested in the learner having the experience of being in a scenario wherein applying one’s understanding of a disciplinary concept has impact on the (virtual) situation—a situation in which the learner has a significant role and which is semantically revealing, thereby helping learners appreciate the meaningfulness of the concept (its use value) for transforming problematic situation. (20)
- Just as the storyline narratizes the to-be-learned content, the relationship among conditions, actions, and outcomes—the anatomy of player choices—ensures that our designed game play involves disciplinizing the narrative: that is, to make useful game play decisions the player must leverage disciplinary understandings to make meaningful play choices. (20)
- Curriculum designers might benefit from an examination of how gaming methodologies and technologies situatively embody the player and the to-be-learned content in rich participation structures. (28)
By bounding up disciplinary context within interactive narrative contexts, we have the potential to not only change learners' understanding of the use value of the content and also offer the opportunity for learners to see themselves as capable of meaningfully applying disciplinary content. (29)

Chapter 3 - Exploring Cognitive Load in Immersive Educational Games: The SAVE Science Project (Brian C. Nelson, Diane Jass Ketelhut, & Catherine Schifter)

The rich experience enabled by virtual environments contributes to what Mayer and Clark (2007) label the “rich media paradox.” The simultaneous presentation of multiple information sources supported by virtual environments raises a learner’s cognitive load (the mental effort needed to process all the visual, textual, and audio elements) until (s)he experiences cognitive overload, with the incoming stimuli outstripping the capacity of the learner’s memory systems to process the information. (34)

In the SAVE Science project, students have an overall goal of uncovering the likely contributors to a series of problems facing a small virtual town (sick farm animals, weather-related crop failure, and climate-related problems with the town’s water)... Upon analyzing final student reports, looking for evidence of understanding of inquiry (e.g., uses data to design hypothesis, experiment is designed to test hypothesis), reports written by students in the River City treatment scored twice that of those written by students in the control treatment. (33)

We are aiming for what we call “essential complexity” of experience—a high level of immersion and embodiment coupled with a reduction in the sense of complexity and associated cognitive load detrimental to completion of assessment tasks. (38)

Chapter 4 - Multi-Modal Investigations of Relationship Play in Virtual Worlds (Yasmin B. Kafai, Deborah Fields, & Kristin A. Searle)

We propose a narrative approach that rebuilds the online life of participants by condensing data points into comprehensive accounts. We contend that this approach can reveal particular social practices across online and offline spaces and aspects of individual players’ participation not captured otherwise and hence well suited for our focus on anticipatory flirting and dating. We thus applied a new method to analyze logfile data, called qualitative logfile analysis (Kafai & Fields, in press). We then combined the insights gained from qualitative logfile analysis with other data sources to create a fuller picture of anticipatory flirting and dating. (43)

The relatively negative opinions about flirting and dating in Whyville published in The Whyville Times contrasted with the widespread prevalence of these activities...Newer players are more likely to try out widespread flirting while more experienced players tend to develop a preference for particular activities or areas of the virtual world. (47)

Chapter 5 - A Next Gen Interface for Embodied Learning: SMALLab and the Geological Layer Cake (David Birchfield & Mina Johnson-Glenberg)

SMALLab is a mixed-reality environment where students collaborate and interact with sonic and visual media using full body movements in an open physical space... This paper presents two experiments pertaining to SMALLab learning in the earth science domain. (51, 53)
• Taken together, these two studies offer encouraging evidence that next generation interfaces such as SMALLab are feasible in a classroom context and can have a powerful impact on student learning. (57)

• These studies are encouraging and demonstrate that significant learning gains can be made in embodied, mixed-reality environments above and beyond the gains expected from traditional instruction. (59)

Chapter 6 - Wee Wii: Preschoolers and Motion-Based Game Play (J. Alison Bryant, Anna Akerman, & Jordana Drell)

• There were three key objectives for this research. The first was to understand the range of physical and cognitive abilities of preschoolers in the context of motion-based game play...The second objective was to understand how preschoolers interact with the Wii, specifically how they handle the various forms of play and game mechanics offered by the games currently on the market for this platform. The final objective was to understand the expectations of the parents of preschoolers with regard to these new gaming platforms and the purchase and play contexts within which game play occurs. Our goal was to investigate these considerations in an exploratory manner. (62)

• One of the most critical findings is that the Wii was seen by most parents as a gaming “equalizer” – something that everyone in the family, including the preschoolers, could play. It was always set up in the living room as opposed to in the children’s room, which was more prevalent with other console systems, so that everyone could have access to it. (68)

• The critical learning was that preschoolers’ movements are grossly exaggerated compared to adult movements, due to a lack of coordination and developing motor skills. In order to effectively create games for them, developers would need to make sure that the “hotspots” (the areas on the screen that would detect Wiimote movement) are sufficiently large and less sensitive than when programmed for adults. (71)

• Because young children are still developing their sense of spatial perception, “persistent worlds” and graphics that require them to translate maps in relation to “where they are” in a world were very confusing to them...Another challenge for preschoolers is any form of multi-step or complex game play...A final cognitive aspect of play that was particularly evident with the Wii was the importance of personalization for preschoolers in enjoying their game play. (73)

Chapter 7 - Decoupling Aspects in Board Game Modeling (Fulvio Frapolli, Amos Brocco, Apostolos Malatras, & Béat Hirsbrunner)

• We propose an extensible and efficient framework called Flexiblerules that aims at taking advantage of both approaches (i.e., physical and digital), by allowing the implementation of board games in a fully flexible and decoupled way. The Flexiblerules framework is comprised of both a conceptual model to design board games and a set of tools, including a domain-specific language and a dedicated compiler, to realize the aforementioned design. (79)

• The need to establish standard models for the design and subsequent analysis of games is evident, as it allows for a common understanding and a shared vision among developers and also users. (80)
We recognize two levels of abstraction as far as game modeling is concerned, namely logic and representation, which provide us with an initial separation of concerns. These concerns are modeled separately as logical and representation layers, dealing with a low-level description of game dynamics, and the high-level interface with the real-world (typically a graphical or tangible representation) respectively. Thus, the game model can be viewed as the composition of these two layers. (81)

In this paper we presented the Flexiblerules framework for the modeling of board games. The proposed game model is composed of taxonomy of entities with precise properties and behaviors. In order to simplify the conceptualization of rules, we proposed a decoupling of the game logic into different aspects: laws, behaviors, and side-effects. Consistent with the goals of aspect oriented programming, we believe that such a separation of concerns allows for a more natural way to define the logic behind board games. (95).

Chapter 8 - Effects of Playing a History-Simulation Game: Romance of Three Kingdoms (Kwei Wang)

Researchers who study game playing are nearly certain that the more frequently a player plays games, the more confident and the more fluent he or she will be in gaming. (97)

The study reveals that RTK players exhibited higher motivation to access media pertaining to the Three Kingdoms history than did the non-RTK players, that the RTK-players were more knowledgeable about the Three Kingdoms history than were the non-RTK players, and that many of the RTK-players were motivated to learn about this period of history by playing RTK. (110)

Game designers who are interested in promoting learning motivation might consider similar strategies to present real historical events and geographical backgrounds of their own history to game players. (111)

Chapter 9 - The Design of Virtual Space: Lessons from Videogame Travel (Steve Guynup)

In the world of videogames, designers utilize death as the ultimate penalty and they balance it against constructs that imply success. In a well designed game, all task failures support the user’s overall experience and are used to create a sense of value in the completion of game tasks. This leads to some interesting choices in terms of design. (122)

It could be said that invention deals with reality, while convention deals with realism. In virtual space, setting up a design dynamic of realism vs. reality is appealing, but in videogames, much like in film, realism is subordinate to narrative. (124)

Travel, presented in great detail, offers insight into the nature of videogames, virtual space, and the subjects like narrative, realism, usability, motivation, and human computer interaction. The key dynamic within this document is the complex relationship, conflict and harmony between user experience and task completion. (135)

Lastly, if good interfaces are transparent to the task, what does that mean for 3D worlds that strive to be the opposite? The opposite of transparent is immersive, as in the all-surrounding, always present videogame space that guides the users actions as opposed to being the completely interface, wholly subordinate the users wishes. Such questions are difficult to address, but addressed they must be. (139)
Chapter 10 - Effects of Built-in Audio versus Unrelated Background Music on Performance in an Adventure Role-Playing Game (Siu-Lan Tan, John Baxa, & Matthew P. Spackman)

- As sound design has advanced, the player has taken on an increasingly active role with respect to video game audio. Gamers must decipher cues in the musical score for information about the surrounding environment, and listen for sound effects such as footsteps, which situate the player within the virtual environment. Audio cues alert players to approaching danger, guide them in tracking the moment-to-moment location of enemies, and give immediate feedback on successful execution of actions... Despite video game audio’s growing relevance in game design and the wealth of information that it can convey, few empirical studies have examined the role of sound on players’ performance and game experience. (143)

- Our study compares the effects of (1) built-in video game audio that is contingent on the player’s actions and events on the screen (such as sounds of sword slashes, auditory warnings of approaching enemies, and music that signals that one is entering a new territory within the virtual environment), and (2) a musical soundtrack that is unrelated to the player’s actions or to events unfolding in the game (therefore referred to as Non-contingent Music). (147)

- The findings of our study do not suggest any simple relationships between video game audio and performance or quality of the game experience....what emerged is a picture that is more complex and open to individual variation than we had anticipated. (156)

- An unexpected and striking finding of this study was that the highest performance scores were not earned in the conditions with built-in audio, but when playing with background music that was unrelated to the player’s actions or events in the game. Specifically, players earned the highest means for total performance score and most performance subscores, and needed the fewest ‘continues’ in the Non-contingent Music condition. (157)

- Among the practical findings that emerged is the discovery that when it comes to video game audio, ‘more is not always better’ - especially during the initial stages of learning a new game. Further, we discovered that gamers are not a homogeneous group but respond quite differently to the same playing conditions at various stages of a new game. Thus, allowing players to tailor the audio to fit their preferences and the demands of a particular game, as well as the flexibility to modulate these settings as they advance in a game, may lead to optimal performance conditions and the most positive gaming experience. (160)

Chapter 11 - Measuring Student Perceptions: Designing an Evidenced Centered Activity Model for a Serious Educational Game Development Software (Leonard A. Annetta, Shawn Y. Holmes, Meng-Tzu Cheng, & Elizabeth Folta)

- When students create games with support by teachers in terms of content accuracy, time allowed, and recognition of the work involved and this technology becomes part of the school culture—students become more engaged in the content as well as proficient producers in the digital world. They are thereby simultaneously introduced to modeling and design through immersion in the virtual space. (166)

- One main focus to the teacher professional development regarding Serious Educational Game design and infusion into the classroom was the notion of learning becoming stealthy. That is a
good game would not make students think they were learning but rather they were simply playing in class. (176)

• What this tells us is that there are clear components of some of these games that met or exceeded the goals of being educational; yet stealthy. Moreover, this informed the research team that this was more of a training delivering issue then it was a software issue. To this end the software is only as good as the training and those using it for educational purposes. (176)

• This confirmed that most teachers are not gamers and thus, missed the “fun” of Serious Educational Games. (176)

Chapter 12 - Computer-Generated Three-Dimensional Training Environments: The Simulation, User, and Problem-Based Learning (SUPL) Approach (Michael Garrett & Mark McMahon)

• The abilities of 3D gaming technologies, in particular the game engines used to power FPS games, have not gone unnoticed, with proponents of computer assisted learning recognising the potential of these technologies to function as simulation environments. This has given rise to the serious games movement, which focuses on the application of gaming technologies and concepts for simulation and learning purposes. (184)

• This framework, referred to as the Simulation, User, and Problem-based Learning (SUPL) approach, identifies a series of design factors which guide the learning process and facilitate the transfer of knowledge relative to user, problem-solving task, and 3D simulation environment components. Central to all three components are the aspects of problem-based learning which mediate the learning process. (186)

• Simulations and problem-based learning share common goals in that they are both directed towards the application of knowledge and concepts to new situations. Thus, problems can be provided that replicate authentic tasks and enhance the potential for transfer inherent in problem-based learning. (187)

Chapter 13 - Friendship, Closeness and Disclosure in Second Life (Don Heider & Adrienne L. Massanari)

• Thus, avatars serve an important function within worlds like Second Life – both as expressions of individual identities, and as agents of copresence...So, while some level of fidelity between an individual’s offline behavior and her avatar’s actions is likely to increase our sense of copresence online, and possibly lead to more meaningful relationships with other players, there is a point at which too much realism actually detracts from an individual’s willingness to disclose information more about themselves. (206)

• What we’re most interested in is that fourth category of self-disclosure. In observations over these four years we noticed a significant difference in people’s willingness to self-disclose than in normal everyday real life encounters, and thus, social relationships often have a different quality in Second Life than in a non-virtual world. (208)

• Early theory about how computers might affect communication predicted less effective and less meaningful interaction. But we found in some cases, just the opposite, where people in disparate locales formed close relationships in ways that might not occur through face-to-face interactions. (212)
• We suggest that anonymity, time compression, lack of physical appearance, and word dependence all contribute to a phenomenon wherein people at a rapid rate get close to other people, a phenomenon we are calling facticius contingo. One thing is clear after spending four years in SL that is these places continue to be important to the people who choose to participate. They are more than places people go to be amused or entertained. People develop social interactions they find meaningful, compelling and gratifying. (212)

Chapter 14 - Computer Gaming Scenarios for Product Development Teams (Andrew J. Wodehouse & William J. Ion)

• This paper therefore aims to develop theoretical frameworks for improved use of information in progressive concept design approaches by utilizing characteristics of a field where highly engaging and effective information use are essential: computer games. (217)
• Computer games have been shown to have a number of potential benefits for team utilization of information during the concept design task. Three key characteristics of computer games are increased motivation of participants, controlled interaction during collaboration, and adding structure to the completion of tasks. (223)
• A review of relevant gaming literature as well as an examination of computer gaming genres (including the testing of four titles for illustration) has revealed a number of characteristics in motivation, interaction and structure that are applicable to the design team. (229)
• As games developers continue to produce virtual worlds that are visual, information-rich, and engaging it is important that there is a shared awareness of the activities undertaken in traditional industries where games could potentially enhance current practices. (230)

Chapter 15 - Adaptive Interactive Narrative Model to Teach Ethics (Rania Hodhod, Daniel Kudenko, & Paul Cairns)

• We argue that the development of virtues requires practicing the same way other skills such as reading or writing do. In addition, learning about ethical virtues is different from applying them. (235)
• Interactive narrative is an engaging learning medium that allows collaboration of humans and computers in the creation of innovative experiences. Interactive narrative can be seen as an engaging hook where the player feels in control and can see his actions affecting how the story unfolds. (236)
• Educational games area gained much attention in the last few decades for its powerful engaging property and the ability of these platforms to deliver learning in various domains. They offer an advantage over traditional schooling, where connection between perception and action that is a highly prototypical form of knowledge, can be represented in the following form of production rules: If this is the current situation, do these. Therefore, immersing the student in a (simulated) environment provides a much richer experience than a worksheet or other homework assignment could. (245)
• Different narrative techniques provide various advantages. This paper highlights the synergy of integrating both dynamic narrative and scripted narrative techniques and how a student model can be used to provide an adaptive, interactive narrative model. (245)
Chapter 16 - Bio-Affective Computer Interface for Game Interaction (Jorge Arroyo-Palacios & Daniela M. Romano)

- Physiological signals offer a promising medium to interact in a natural and intuitive way with the game environment. In addition of being reliable, sensible and provide real time feedback, physiological signals offer an insight into human’s physical and mental state which can be used to enrich the game interaction. (249)
- There are two important observations from the literature reviewed: i) Most of the emotion recognition systems (ERS) follow an ad hoc strategy (i.e., they provide a solution designed for a specific problem or task, non generalizable, and which is not easily adaptable to other purposes); ii) There are very few multi-category discrimination emotion recognition systems implemented in real-time. All the emotion recognition systems of the games presented in Table 1 are aimed to identify the presence or absence of a particular emotion, or to discriminate among small sets of opposite emotions. (250)
- Two machine learning models were trained to recognize the physiological patterns of 4 emotions, having the best results with a PNN with classification accuracy of 84.46% on the training data and 78.38% when it was cross-validated. The two machine learning models were implemented on the system for a real time classification. Finally, a simple application that customizes the desktop wallpaper to the emotional state of the user was developed. The results from our study provide evidence of the feasibility of the use of BAGI as an interface for gaming. (263)

Chapter 17 - Evaluating User Experience of Actual and Imagined Movement in BCI Gaming (Bram van de Laar, Boris Reuderink, Danny Plass-Oude Bos, & Dirk Heylen)

- While measuring brain activity for detection of movement, whether actual or imagined, other information can be derived from the brain as well, such as the user’s mental and emotional state. This could be used to make smarter applications which are more aware of the user. (267)
- Results from this study showed that differences in user experience and in performance between actual and imagined movement in BCI gaming do exist. Actual movement produces a more reliable signal while the user stays more alert. On the other hand, imagined movement is more challenging. (276)
- Because of the similarities in brain activity between actual and imagined movement and the somewhat lacking of intuitivity for imagined movement one might suggest using actual movement as a training for using imagined movement. The user of the BCI can get accustomed to using movements for communications and at the same time trying to imagine the movement. With the acquired data from the actual movement, the imagined movement could be classified. (278)

Chapter 18 - Towards Games for Knowledge Acquisition and Modeling (Stijn Hoppenbrouwers, Bart Schotten, & Peter Lucas)

- One idea we are exploring is to look at formal knowledge modelling activities as games (or, more modestly put, ‘game-like procedures’), forcing ourselves to look at contextualised, operational modelling in which human factors are inevitably included. Because the way in which we employ games for formal knowledge modelling involves human-computer interactions (HCI), these
games-for-modelling systems can best be tested using HCI-like evaluation methods, including existing methods specifically aimed at game evaluation. This combination, games-for-modelling and exploitation of HCI methods for evaluation, is, to the best of our knowledge, new to AI. (282)

- Our observations suggest that there is indeed a noticeable difference between players with and without modelling experience. Despite our intentions to make the game playable for players with little or no expertise in modelling, most of those players found it hard to get started. It took them a while to understand what was meant by “task”, “step”, “ingredient” and “product”. It was somewhat of a surprise to us that people by nature do not seem to make a sharp distinction even between actions and objects: sometimes they confuse the name of a step with its products, or describe substeps instead of ingredients. (295)

- A further interesting observation is that advanced functions of the game are generally not used. Players simply look for the easiest way to succeed in the game. (296)

Chapter 19 - Automated Event Recognition for Football Commentary Generation (Maliang Zheng & Daniel Kudenko)

- Most models of events are so complicated that they consist of many rules, for example, ROCCO uses 8 rules to define the ball-transfer event (Voelz et al., 1998). Thus, the generation of reliable models by hand is rather inefficient and may even be infeasible for a large number of more complex events. (301)

- In this paper, we present our work on automatically generating commentary rules using inductive learning techniques. Rather than establishing direct relationships between raw data and all commentary concepts, most practices start by extracting fundamental concepts from raw data (Stolarski, 2006), and organizes concepts in a hierarchical way. In other words, the event recognition process can be developed incrementally, and usually commences with modelling the basic actions. Techniques for recognizing the play-by-play events involve state machines, propositional. (313)

- rules, and quantitative analysis. We have described an approach to in-game commentary generation, which is based on the mapping of states to commentary concepts. We showed that while some concepts can be produced by hand-coded mappings, other concepts require a more sophisticated approach. Specifically, we propose the application of inductive learning, and the results of our case studies show the feasibility of this approach for the integration of high-level scene analysis and intelligent classification. (313)

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