**BOOK REVIEW**

**Serious Games: Mechanisms and Effects**

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Ute Ritterfeld, Michael Cody, and Peter Vorderer

*Serious Games: Mechanisms and Effects*

Routledge


552 pages

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*Serious Games: Mechanisms and Effects* is a compendium of 28 chapters about theory, research, and applications of serious games or gaming in general. Most of the chapters are written by academics in the field of communication, psychology, education, comparative media, and economics. Most of the chapters began as presentations at the May 2007 Annenberg Workshop on Games for Learning, Development & Change! organized at USC by Ritterfeld, Cody, and Vorderer.

Only 17 of the 28 chapters are specifically about serious games. Chapter titles are often misleading in that regard. For example, "The Impact of Serious Games on Childhood Development" is not about serious games or childhood development. Three serious games chapters define serious games in an unusual way, and then proceed to discuss what would have otherwise been considered games for entertainment.

Many of the literature review/theory chapters lament the lack of empirical studies, yet very few chapters provide original research findings. The handful of empirical chapters tended to be intriguing and original. Three chapters in Part I by lead editor Ritterfeld report on original research in which she applied content analysis and informant-based qualitative methods. In the final section, Henry Jenkins summarizes major insights from a decade of his games for education projects at MIT. Joost Raessens conducts deep readings of Darfur is Dying and World Food Program’s Food Force. Ironically, none of the research reported in these chapters conforms to the proposed theoretical frameworks or methods called for throughout the middle parts of the book.

In some ways the book embodies the challenges of serious game research better than it describes them. Serious games are few in number but extremely diverse in audience, specific learning, health, persuasive or other goals, topic, genre, complexity and duration of play. The book does not propose solutions, but a challenge for serious games research will be to find ways to glean evidence and insights from diverse, seemingly idiosyncratic, game and context-specific observations and develop guidelines to help those conducting summative research more easily and systematically contribute to generalizable theory and research. For example, chapter XXIV describes quantitative clinical trial results of NIH-funded 3-D game environments to help with stroke recovery. The stroke recovery chapter unintentionally exemplifies the kinds of empirical findings the Sherry and Dibble chapter dismiss as be-
SERIOUS GAMES:
EXPLICATION OF AN OXYMORON

The forward by Ben Sawyer, founder of the serious games movement, explains the origin and growth of the term and urges researchers and practitioners to adopt a broad conceptualization of this emerging field, to encompass its true potential.

Chapter II, “Classifying Serious Games,” presents a quantitative snapshot of some aspects of the state of serious games. Researchers Ratan and Ritterfeld categorized 618 serious games by platform, target age group, primary purpose and primary learning principles (practicing skills, knowledge gain through exploration, cognitive problem solving, or social problem solving). Classifying serious games based on their primary learning principles schema could be applied in future studies.

“Enjoyment of Digital Games: What Makes Them Seriously Fun?” looks at games for entertainment, not serious games. Wang, Shen, and Ritterfeld applied a unique expert-user research methodology to construct a comprehensive list of 30 game fun factors. They treated published professional game reviews as expert informants, and conducted content analysis of 60 game reviews. Five key underlying dimensions of digital game enjoyment emerged: technological capacity, game design, aesthetic presentation, entertainment game play experience, and narrativity. The chapter concludes with observations about which fun factors are expected and necessary and which are rare but perhaps for that reason boost fun and contribute to top game ratings.

“Serious Games and Seriously Fun Games: Can They Be One and the Same?” compares the enjoyment value of 7 freely available PC-based serious games. The analysis is based on one player’s qualitative and quantitative responses concerning the enjoyability of each game. On a scale from 0 to 100% enjoyable, the player’s ratings for the seven games ranged from a high of 70% (for America’s Army) to a low of 20% (for Darfur is Dying and Hate Comes Home). The authors conclude that “enjoyability aspects of digital games are very similar for both [serious and entertainment game] genres.” The player was male, had ten years of gaming experience, and was not particularly aware of serious games before participating in the research. The authors do not discuss whether people who are not frequent male gamers might experience higher enjoyability playing games about genocide in Darfur, the dangers of discrimination in schools, or the history of 17th century England. The research technique is creative and promising. The study could be improved by contrasting the ratings of the frequent male player with those of a second player, perhaps a woman who rarely plays games.

THEORIES AND MECHANISMS: SERIOUS GAMES FOR LEARNING

The five chapters of Section II are theoretical overviews from different disciplinary perspectives. All but one focuses exclusively or mostly on digital games for entertainment rather than serious games. Learning theorist James Paul Gee’s “Deep Learning Properties of Good Digital Games: How Far Can They Go” articulates properties of digital entertainment games that enable players to experience control, agency, deep learning and mastery. He argues that these properties help entertainment games create commitment and attachment to play and learning.
Gee posits that serious games would benefit by incorporating these same properties.

Health communication scholar Debra Lieberman wrote “Designing Serious Games for Learning and Health in Informal and Formal Settings.” She contrasts constraints and affordances of games for health in formal and informal contexts. Health game goals include yet go beyond knowledge gain because many also seek changes in attitudes, beliefs, skills, and behavior. Formal learning involves assignment, assessment, and a specific curriculum whereas informal learning takes place during leisure time. Serious games for health can make use of constructivism, immersion, and simulations to enhance learning. Similar fine writing by Lieberman and Gee has been published elsewhere, but a compendium about serious games would not be complete without chapters from them.

In “Deep Learning and Emotion in Serious Games,” psychology and computer science professor Arthur Grasser and colleagues discuss areas where psychological research has implications for game design. They write about their research on intelligent tutoring systems (ITS) and automated agents as systems which successfully promote deep learning. They recount a poignant personal experience with trying to guide a learning community of students to develop learning games related to psychology. Despite considerable coursework, the resulting six games only engaged players with basic, surface level concepts in psychology. Creating deep learning in fun serious games is far from easy. The chapter authors wonder why psychology is “functionally out of the loop” of the entertainment game market. They question whether the constraints of games make it difficult to integrate deep content, strategies, and skills. They question whether experiencing boredom and confusion (diagnostic of cognitive disequilibrium) may be necessary components of the process of deep learning.

A number of chapters review theories and research from television and other communication media, drawing parallels to games and pointing to potentially useful constructs. “Psychological and Communicological Theories of Learning and Emotion Underlying Serious Games,” “What Do Children Learn From Playing Digital Games?” and “Designing Serious Games for Children and Adolescents: What Developmental Psychology Can Teach Us” are three such chapters.

**SERIOUS GAMES FOR DEVELOPMENT AND SOCIAL CHANGE**

Identity formation and gender play through gaming are both considered serious games in the book, even though common definitions of serious games probably would not include them. In “Identity Formation and Emotion Regulation in Digital Gaming,” Ritterfeld proposes a new definition of serious games —that the individual effect of play are the ultimate criteria for seriousness, not the producer’s intention, not the game or its content. She suggests that “successful completion of emotion regulation episodes” qualifies as a desired and hence serious outcome of some game play. When a player seeks emotion regulation episodes through game play, the played game would be considered a serious game. Examples self-regulatory game outcomes could include reduction of fear, anger, or shame or facilitation of pride or joy. I appreciate the reminder of the importance of how games impact the player. However I question whether broadening traditional definitions further muddies the theory and research. If no one knows whether a game is a serious game until it has been played, how do we study them?

In “Serious Games for Girls? Considering Gender in Learning with Digital Games,” learning scientist Yasmin Kafai makes the case for why gender should (still) matter in the playing and making of game for learning. She reviews research literature on gender and gaming overall as well as educational gaming. She discusses Butler’s notion of gender play, normal experimentation with gendered expressions in various contexts. Kafai proposes two categories of seri-
ous games, Games for change which challenge gender stereotypes and games for girls which enable play consistent with stereotypes of what is appropriate for girls.

Chapters XVI and XVII review traditional media effects models and suggest ways to apply them to games. Entertainment Education (E-E) has been successfully applied to create social change soap operas. E-E is defined as a theory-based communication strategy for purposefully embedding educational and social issues. Serious games may address health or social issues, but unless their design is based on psychological, communication, and education theories, serious games do not fit the Entertainment Education rubric, regardless of their actual effectiveness. The authors are confident that E-E approaches would result in more effective social change games, even though the effectiveness of serious games for change is not known. My initial reaction was to bristle at the lack of appreciation for the specialness of gaming as a medium, including the extreme complexity of creating a great game. I suspect that games to E-E would need to begin with using a well established game genre (much like was done with soap operas). An established genre has refined, reified core game mechanics and player expectations about rules and goals and player actions. Game structure and content could be gently tweaked to support theory driven content.

METHODOLOGICAL CHALLENGES

The six chapters on methodological challenges of serious games research were written by academics with experience conducting research on other media. Chapters XVIII and XIX contemplate in-game data collection during play, for stealth assessment of learning or even monitoring of the player’s momentary psychological situation during play. Shute and colleagues, while sometimes unrealistic (“we first need to ascertain exactly what it is players are taking away from games such as Grand Theft Auto IV…”), imagine games that automatically gather evidence about player learning and incorporate that kind of score as part of the overt rewards of the game, thus enticing player to value learning.

Chapters XX and XXI presume that the important dependent variables are post-play effects, posing research questions such as did the game work, and how did it work. Serious games are viewed as interventions. Interactivity and play become complicating factors to control.

Chapters XXII and XXIII review methodological challenges in relation to games in general, not serious games. They succeed in clarifying how complicated game studies are to do well, but do not provide much tangible guidance on how to actually solve gnarly problems like generalizability. Chapter XXIII explains, “playing digital games represent a radically unstable stimulus…”

APPLICATIONS, LIMITATIONS, AND FUTURE DIRECTIONS

The final section includes four chapters written by authors involved in the actual design of serious games. Chapters XXIII and XXIV describe the design process and challenges faced by two NIH-funded projects related to serious games at USC.

“Reducing Risky Sexual Decision-Making in the Virtual and in the Real World: Serious Games, Intelligent Agents, and a SOLVE Approach” is written by a USC team that has been developing “interactive virtual environments” that simulate risky decision-making. Their work exemplifies theory-driven health communication interventions. They identify affordances of interactive video environments (IAV) and then discuss how intelligent agents and gaming technologies could improve upon the limitations of IAV. Their applications are grounded in the science of risky decision-making. The presence or absence of Ritterfeld’s 30 fun factors (from Chapter 3) would be irrelevant to the designers. Their goal is a successful intervention. If it is also a game, that is fine. Or it can simply use
gaming technologies.

“Immersive Serious Games for Large Scale Multiplayer Dialogue and Co-Creation,” describes 15 years of development of “Immersion Cinema” art and informal learning installations by new media artist and visionary Stacey Spiegel. Each of the works has a serious purpose beyond entertainment, but most would not have been considered games. The chapter touches lightly upon some of the recurring themes in the book – learning in an informal setting, immersion, and multiplayer. However, the chapter as it is written does not fit well with the rest of the book because it does not address needs and interests of the intended audiences (communication researchers, other game studies scholars, or serious game designers).

“From Serious Games to Serious Gaming” Henry Jenkins and many others from the MIT Comparative Media Studies Program is packed with Jenkins’ typical stunning and delightful insights. It stands as the only chapter in the book – learning in an informal setting, immersion, and multiplayer. However, the chapter as it is written does not fit well with the rest of the book because it does not address needs and interests of the intended audiences (communication researchers, other game studies scholars, or serious game designers).

None of the projects described in the Applications section of the book are publically available serious games. In fact, only the MIT prototypes adhere to the typical definitions of a game. The others are game-like interventions or installations. Because they are research prototypes and not commercially sold or free online games, the projects not only are not publically available, they may no longer exist in a playable form. Very few people have ever played them. None would have appeared in the Chapter III classification study of serious games. The lack of access to prototypes and serious games created by researchers impedes research. To help game research, ideally, at a minimum, screen shots and digital video of these prototype games being played should be archived and posted online, to permit content analysis. When possible, the game itself should be made available to other researchers.

The last chapter, The “Gaming Dispositif: An Analysis Of Serious Games From A Humanistic Perspective,” was my favorite because it offered a perspective that I had not encountered before applied to games I was familiar with. Raessens uses the “dispositif” as a heuristic tool to conduct close readings (paralleling film studies traditions) of Food Force and Darfur is Dying, two political-ideological games for change. A dispositif focuses attention on the ways in which the player is addressed or positioned by the game, in terms of the technological base, the game itself, and the context of the game. Citing Zizek’s construct, “interpassivity” (a rift on interactivity), he notes that players in a game may interact through another agent. The agent does the player’s job while the player sits back and watches. To quote Pelletier: sometimes “learning takes place not through play but through reflection on the game’s content.” Raessens questions the assumption that the player is in control, pointing out that play requires surrender to the rules and roles of the game. Individuals can approach a game ironically; consciously aware of rejecting tenants or ideology involved in play, they can critically reflect upon and accept such messages, or play uncritically.

CONCLUSION

In conclusion, Serious Games: Mechanisms and Effects is a first attempt to bring order to the theories, conceptualization and conduct of research on the emerging medium of serious games. Many of the chapters offer important,
useful, and diverse perspectives. The book would have benefited from selectively limiting the volume to particularly substantive and unique chapters, and from adding sense-making and integrative introductions to the various sections. As a whole, the book demonstrates and makes the case that serious games are conceptually and practically challenging and unruly yet worthy of study.

Carrie Heeter is a professor of serious game design in the Department of Telecommunication, Information Studies, and Media at Michigan State University. She is co-editor of Beyond Barbie and Mortal Kombat: New Perspectives in Gender, Gaming, and Computing and creator of Investigaming.com, an online gateway to research about gender and gaming. Heeter’s innovative software designs have won more than 50 awards, including Discover Magazine’s Software Innovation of the Year. She has directed software development for 32 projects. Her research looks at the experience and design of meaningful play. Current work includes design of learning and brain games which adapt to fit player mindset and motivation and persuasive games where the designer goal is to engender more informed decision-making on complex socio-scientific issues. Heeter also serves as creative director for MSU Virtual University Design and Technology. For the last 12 years she has lived in San Francisco and telecommuted to MSU.