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# Book Review

# Transforming Gaming and Computer Simulation Technologies Across Industries

Reviewed by Pei-Di Shen, Institute of General Education, Ming Chuan University, Taipei, Taiwan
Reviewed by Hui-Wen Tang, Institute of General Education, Ming Chuan University, Taoyuan, Taiwan
Reviewed by Lynne Cheng Hsu, Institute of General Education, Ming Chuan University, Taipei, Taiwan
Reviewed by Min-Ling Hung, Teacher Education Center, Ming Chuan University, Taipei, Taiwan
Reviewed by Chia-Wen Tsai, Department of Information Management, Ming Chuan University, Taipei, Taiwan

Gamification has drawn much attention recent years across industries and countries; many discussions regarding the merits and shortcomings of its implementations in varied fields inspire more innovations (Seaborn & Fels, 2015; Liu, Huang & Zhang, 2018; Cardador, Northcraft & Whicker, 2017; Hamid & Kuppusamy, 2017). Whether it is used to motivate learning interests, working effectiveness, improve user experience, for training purposes, or simply to introduce new concepts, gamification and digital experience are intertwined with people's daily lives. It is therefore important to get ready to embrace this new wave, and the book "Transforming Gaming and Computer Simulation Technologies across Industries" serves as a proper guide book. It is divided into three themed sections: User Research, Learning Applications and Health Enhancement. Each theme paves the way to the next, making the book contents closely interconnected.

The opening chapter of section one starts from quantifying "Magic," as the authors dive into various aspects of developing the Kinect sensor system. This renowned device enables users to interact with on-screen elements by moving their bodies or by speaking. The authors list major technical challenges that game designers and programmers face when constructing game elements, and through their insights, readers could pay more respect to the efforts behind game development, and reconsider Kinect's unique user experiences. The next chapter takes readers into the game theories of Grind Core, Freemium, and Immersion. With apt and intriguing examples, the author successfully illustrates the implementation of these theories in real life games. Figures and story flow all correspond to the theories mentioned with precision.

The authors in chapter 3 conducted a quantitative and qualitative research study to explore how customization and dimensions of identification predict player motivation in a massively multiplayer online game, Lord of the Rings Online. By carefully elaborating on the definitions in past literature, the authors give readers an almost step-by-step immersive experience into the research itself. The results indicate that avatar-based customization increases players' identification with their characters, as well as players' sense of autonomy, agency and motivation. Authors of chapter 4 begin a discussion about the

use of Multi-user Virtual Environments (MUVEs) and the influence of anonymity in class discussions. Undergrads with various ethnic backgrounds were distributed into a $2 \times 2$ between-subjects design, in the hope of examining anonymity in learning. The results suggest that MUVEs should be used to facilitate pedagogy activities, instead of as a communication medium. Also, regardless of online discussion format, anonymity appears to be harmful to learning outcomes.

In the last chapter regarding User Research section, the authors examine the divergent results of participants' experiences and outcomes when performing in digital and non-digital platforms. In the game of POX, authors find that participants in the digital version tend to make hasty and localized strategies instead of thinking things through, despite the game elements between the two platforms being almost identical. They propose possible explanations such as players could be at a lower level of cognitive construal, or perhaps their physiological states when facing the digital format influences their judgments of game complexity.

After wrapping up section 1, the next theme in this book is learning applications. In chapter 6, the author looks into the various kinds of medical games, makes individual introductions and lists their advantages. By ranking the fidelity, from lifelike complex ones like Physiology Engines, to low fidelity such as the Simple State Machine, the author goes on to introduce the application of Virtual Reality Simulations. The author's precise wording and figures make it easy for readers to quickly grasp the main features and capabilities of these medical tools. Chapter 7 further expands the topic into discussing how serious gaming teaching physicians technical procedures could benefit future physicians. An interactive screen-based game which simulates central venous catheter placement was developed in the research by authors and a software company. Despite some major flaws which authors genuinely point out (software technical problems, small sample size, and the lack of independent evaluators of the program due to resource constraints), the results are somewhat comforting. The students in the game group performed more standardized practices than those of the traditional teaching group and survey responses were positive from the game group.

Chapter 8 examines the effectiveness of the use of ludic simulations in middle school space science. To support students' learning and motivation, the researchers introduce a simulation called Alien Rescue (AR), and collect questionnaires for further analysis. Sixth and seventh graders' responses are analyzed according to the constant comparative method of analysis practice. Findings in the word cloud show that students consider AR to be FUN and HELPFUL to LEARN about the solar system. Authors create elaborative tables for better understanding students' comments on the game, and call for future research regarding the use of ludic simulations, which may be valuable for STEM-related fields.

Section 3 on health enhancement and clinical intervention contains six chapters with topics ranging from childbirth to elderly health care. Chapter 9 begins with an ongoing project about developing a game teaching childbirth support techniques for Dads-To-Be. Extensive analysis and figures illustrate the details such as consulting channels people use, preparation methods that are considered useful, and recommendations to a friend. Author used human-centered design, and employed the findings from a childbirth preparation survey to design an iPhone game "Digital Birth", which targets for lower-income Latino families from California through prenatal clinics and low-cost maternity centers. Although the game is still being tested, this research provides some useful insights for developing related games. Chapter 10 jumps into a brief discussion on how video games could be helpful to visual outcomes. A small test group of high school players uses a trainer game that focuses on the mechanism of action delivered by repetitive gaming; the test results show improvement in players' batting performance and thus provide proof for future video game development.

The focus of the next chapter turns to past research on possible beneficial interventions among older adults using games and exercises. Three goals (improving performance on untrained tasks, remediating observed cognitive declines, and ensuring preservation of functional ability) are selected for framing of this study. After carefully consolidation, the author briefly concludes that most research focused on untrained tasks showed modest benefits for cognitive tasks. As for other goals, due to

the low number of studies on these topics, the author calls for more efforts in these fields. Yet, some research, which produced limited success, shed some light on the future of using games and other training interventions to improve cognition in healthy older adults.

The author of chapter 12 presents an exciting case study of using computer-presented and physical exercises to directly improve thinking abilities essential for academic success among elementary school children. This project, Activate, can automatically shape treatment to fit the needs of individuals and provide online error diagnostics for teachers to adjust instructions. The results provide evidence that Activate has beneficial effects for many children, even children with ADHD and those assigned to special education classes. This study strengthens evidence on how gaming activities with appropriate supervision can have positive impact on children.

Through using AMSTAR tool to ensure the quality of all relevant articles, the author of chapter 13 updates the results of systematic reviews which evaluate the effectiveness of exergaming on physical fitness (PF) and physical activity (PA). Regarding the long-term effects of exergaming on PF among children, youth and the elderly, the findings show that the beneficial effects are limited. Although it was found to be an enjoyable activity, the evidence of exergaming contributing to the increased PA is also limited or inconclusive. This study points out the lack of research on mobile-based exergaming and also the need for more studies including adults and the elderly. In the last chapter, the author presents a walkthrough for building a digital health tool which combines targeted audiences' (users, buyers, and developers) interests and problems. The commercial development framework for innovative projects in digital health includes three milestones: Problem, Path and Proof. A case study is provided regarding a Home Assessment Tool for older adults to illustrate this business model and correspond to the theme of health enhancement.

This book not only covers aspects like game industry itself (analysis from both the developers' perspective and the players' side), but also takes other applications in different areas (education and medical services) into consideration. Overall the selected articles are clearly written, presented with specific key notes for readers to quickly grasp the major concepts and derive more inspiration from authors' suggestions or insights. However, the sequence of the articles is recommended to be rearranged. For instance, in the health enhancement section, it would be more logical for readers if articles are in some kind of chronical order, starting from discussing child birth and end with elderly care. And as some authors sincerely call for more research on mobile applications associated with gamification, it will truly be more enjoyable to read the next edition containing more related topics.

*Transforming Gaming and Computer Simulation Technologies Across Industries*
*Brock Dubbels*
*IGI Global*
*2017*

## REFERENCES

Cardador, M. T., Northcraft, G. B., & Whicker, J. (2017). A theory of work gamification: Something old, something new, something borrowed, something cool? *Human Resource Management Review*, *27*(2), 353–365. doi:10.1016/j.hrmr.2016.09.014

Hamid, M., & Kuppusamy, M. (2017). Gamification implementation in service marketing: A literature review. *Electronic Journal of Business & Management*, *2*(1), 38–50.

Liu, M., Huang, Y., & Zhang, D. (2018). Gamification's impact on manufacturing: Enhancing job motivation, satisfaction and operational performance with smartphone-based gamified job design. *Human Factors and Ergonomics in Manufacturing & Service Industries*, *28*(1), 38–51. doi:10.1002/hfm.20723

Seaborn, K., & Fels, D. I. (2015). Gamification in theory and action: A survey. *International Journal of Human-Computer Studies*, *74*(2), 14–31. doi:10.1016/j.ijhcs.2014.09.006