Design Decisions and Obstacles in Serious Game Design: Insights from Design Cases

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EXTENDED ABSTRACT

Design cases serve as rich sources of contextualized knowledge, detailing how designed artifacts are created and used in practice (Boling 2010). These cases can illuminate the actions of designers in context, which may diverge from existing models and methodologies (Herriott 2013). Serious games, which can be understood as games developed for purposes beyond entertainment, such as education, training, or awareness, offer unique opportunities for engagement but present intricate design demands. A variety of design-related or external factors can influence these demands. We hypothesized that analyzing serious game design cases could provide insights that would inform future game design and development practices that consider contextual complexities. Our thematic analysis of design cases addressed the following questions:

1) What types of decisions are made by designers in the design and development processes of serious games?

2) What types of challenges do designers face in the design and development processes of serious games?

A search of the literature was conducted using the terms "serious game" "design case" across Google Scholar (357 results) and "game" in a journal that specializes in design cases, the *International Journal of Designs for Learning* (53 results). After paper screening, 27 papers met the criteria for inclusion for this study: 1) these papers covered robust design cases that included extensive and transparent information about context and design and development practices, including failures and obstacles, and 2) the design cases focused on the design of games created for an objective other than pure entertainment. Cases that

focused on gamification and simulations, or that did not provide enough detail about the entire design process, did not meet the criteria.

After the paper selection process was finalized, the lead researcher extracted relevant information from each article. Game descriptions, genres, target audiences, and design and development tools and materials used were captured. This researcher also extracted key design decisions and challenges from each case. After this step was done, two different researchers reviewed the information extracted to ensure its accuracy. The lead researcher and another researcher then coded the design decisions and challenges from each design case and, finally, organized these codes into relevant themes.

The design cases discussed games that varied in format (18 digital, 8 analog, and 1 hybrid) and targeted diverse audiences, including school-age students, undergraduates, professionals, medical patients, and museum visitors. All but two of the cases described design and development processes that were collaborative in nature. The serious games discussed were developed using a variety of tools and skills such as game engines, UI/UX software, coding languages, and physical materials and spaces in the case of analog games.

Our thematic analysis revealed several key types of design decisions. Decisions were made to establish a collaborative and iterative design process that involved students and other relevant stakeholders. Several studies emphasized the importance of stakeholder input in continuous development. Furthermore, decisions related to providing player support were also highlighted in many studies. Different strategies, such as in-game guidance and student facilitation, were adopted to reduce the learning curve for gameplay. Designers also made key decisions in establishing the game world and narrative and the player's role in the game context, connecting content to a storyline. The design of feedback, both implicit and instructional, also required careful consideration.

The design cases analyzed point, however, to persistent challenges in serious game design. Balancing educational and entertainment objectives is discussed as an issue in several designs. These often-non-complementary objectives also made it difficult for designers to align instructional context and practice with game mechanics. Our analysis also highlights challenges in managing contextual variables such as target audience, place of play, resources, and time in design, testing, and play. Moreover, several cases described the difficulty of maintaining player engagement and ensuring a desired flow of gameplay in testing sessions, with decreasing interest as games progressed. Usability issues were also encountered.

Our findings contribute to the understanding of serious game design as a complex, context-dependent process. The analysis of serious game design cases highlights how real-world constraints and variables can impact game design decisions.

KEYWORDS

Serious games; game design; design cases; design process; design challenges

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