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Game Design for Personal Health Management: An Emotional and Educational Perspective

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Abstract

This poster presents the efforts of a graduate student team that developed a board game design to engage children living with diabetes, as well as their friends and parents, in personal health management. Diabetes has multi-leveled health and life style management requirements, and employing a game format can simplify complex concepts in appealing ways and motivate appropriate behavior. The students applied participatory design research methodologies to co-design with subject matter experts, educators, care providers, and end-users. The students utilized game design strategy, character design, and storytelling to develop an emotionally connected and fun activity where game players interact with each other while learning about personal health management. The authors summarized this collaborative design process and shared the learning experiences of the students.

Conference Theme: Toy and Game Design

Keywords: Game Design, Design Research, Design Education, Participatory Design Research, Diabetes, Fun

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Introduction

This poster presents a board game design exploration of an interdisciplinary team of graduate students who participated in a ten-week, hands-on design research course in the Department of Design at a major university. The students were introduced to a variety of design research methods and chose to explore a design-led, participatory approach. A regional diabetes association sponsored the project. Subject experts from this organization provided relevant information and coordinated research participants throughout the study.

About the Game

Balance of Power is an educational board game designed for children aged 7–12 who are living with diabetes. It is also for their friends, family members, and caregivers. Up to four players or teams can participate at a time. Playing the game will help all of them understand the fundamental concepts behind the management skills necessary to balance Diet, Medication and Exercise in order to live with diabetes.

The game board is modular in order to support unique qualities for various play strategies that juxtapose real life situations with fun and engaging game interactions. The game is entirely player-driven, requiring no facilitator, but is designed so that educational facilitation is possible. The game is designed to be inclusive, with different levels of complexity and game length, depending on the age or abilities of the individual players.

Design Research and Concept Development Process (fig. 1)

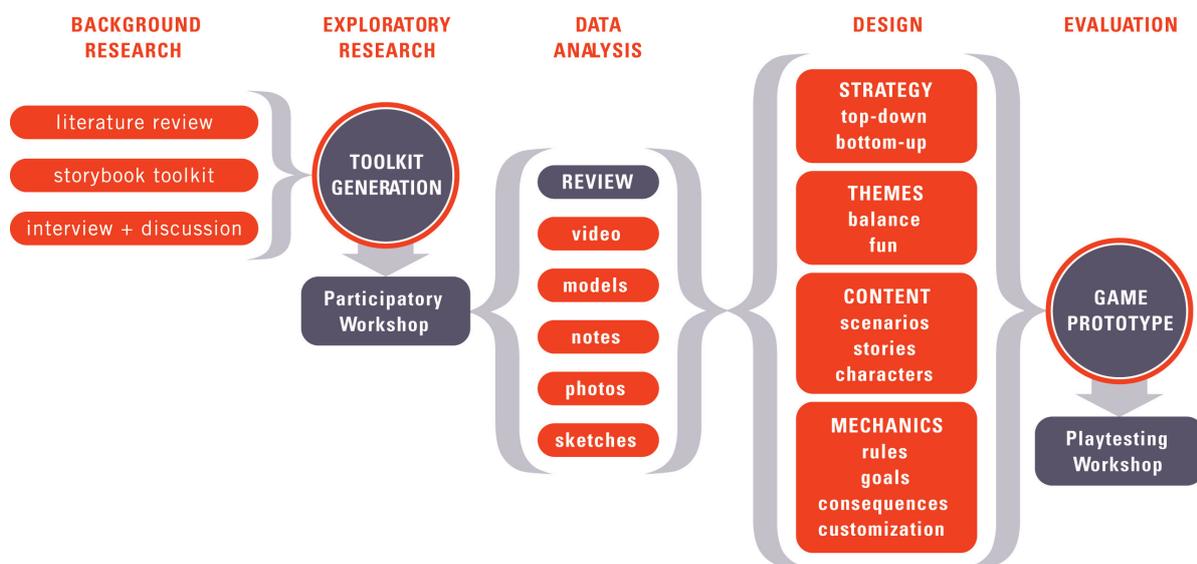


Figure 1: Design research and concept development process outline

Background Research

The research team began by reviewing information provided by the sponsor regarding the project objectives, user profiles, potential play scenarios, and business strategy. They held a workshop with the sponsor's executives and education directors to identify their hopes and dreams for the desired game board. The research team developed a simple toolkit consisting of an open storybook, and had each workshop participant craft a story about the future of this educational board game. The key concepts that emerged were the concept of Balance and the importance of the element of Fun.

Literature Review

The team members started by familiarizing themselves with the subject, its complications, and its management by reading popular publications concerning diabetes and health management, as well as specific literature recommended by the sponsor. Students reviewed sample game concepts and analyzed the unique characteristics of other diabetes themed games. They also studied other established models of game design to gain insight on design language, processes, and strategic approaches.

Exploratory Research

The research team conducted a participatory workshop session with the sponsor team to explore ideas for possible game concepts. The research team applied a participatory design methodology to provide the participants an expressive, creative, and emotionally engaging approach for communication and concept development. The team created a MakeTools kit that consisted of a series of words, symbols, and images that described different aspects of prospective themes. The kit also included a wide variety of small toys, colorful paper shapes, colored markers, and Velcro construction pieces.



Figure 2: Some components of the MakeTools kit that participants used to generate and express ideas for game concepts

Three teams were formed, each with a mix of people from different levels of subject knowledge and design experience. Each team began by selecting key words from the MakeTools kit to frame their initial exploration. These key words were categorized by the subjects of Mechanics, Components, Randomizers, Goals, Concepts and Strategy, Decisions and Consequences, and Context. They utilized a wide range of toolkit components to explore their ideas. At the end of an hour-long session, each team had produced a different, yet thoroughly realized, game theme that focused on various aspects of Balance. Throughout the process, each team devoted special attention to exploring ideas of what constitutes Fun in an educational context. Each team presented their game concept, (fig. 3) after which more in-depth discussions among the whole group followed. The research team collected all game models, kept written notes, and videotaped the whole event for further analysis.



Figure 3: Two preliminary game concept models

Data Analysis

The student team reviewed research and process notes, discussed design options, and evaluated the preliminary game concepts after the Exploratory Workshop. Two prominent ideas were identified: customizable game pieces and the mechanics of the game in relationship to balancing the various aspects of diabetes. The team focused on these ideas for developing the central components of the game. Students then produced two full game prototypes, one based around the popular children's game, Capture the Flag, and others based around concepts of power-ups and collecting items.

Design

The team chose not to elaborate on the visual appearance and graphic application of the game at this early stage of the design concept development. This was a deliberate decision, based on the perception that people would feel more likely to participate in the game's creation if it had a rough appearance. If the game prototype appeared too finished, it was possible that users could feel their input was too late. The end result was a prototype (fig. 4) that was clear enough for

users to understand, but loose enough that there was no particular visual style, and many elements remained hand-made. It proved to be quite appropriate for the research. The participants were comfortable in offering changes and additions. One parent, in fact, created new scenario cards during the play testing session.



Figure 4: The game prototype used in the play testing (left) and a close-up of the customizable game characters (right).

Play Testing Workshop

A second workshop was conducted for play testing the concept with children aged 7 to 12 following the development of the game prototypes. The workshop was designed specifically for the members of the design team to interact directly with the children and their parents in different play sessions to obtain direct observation of the play value, complexity, as well as health management content of the tested concepts. The findings confirmed that the proposed game concepts connected emotionally and intellectually with players. The children expressed excitement over building their own character and strategizing moves, and asked to play the game repeatedly.

Summary

This design and research project involved solving a specific design problem and devising a learning experience about the process of co-creation for a fun and educational board game for all design team members. If the game is fun, then players will be in the right frame of mind to allow the educational component to be absorbed, effectively using an emotionally engaging experience as a springboard for learning.

The student group produced a well thought-out game concept prototype (fig. 5) that incorporated insights from users, sponsors, subject experts, instructors, and colleagues from diverse backgrounds at the conclusion of this design research course. A new design team including graphic and information designers will refine the game board graphics, written content, and structural material applications. Additional research will be conducted with a broader range of participants including the target users, professionals from the health care industry, and game manufacturers.



Figure 5:
The refined game prototypes will be play tested at a summer camp for children with diabetes.

Learning Outcomes

The following comments from members of this interdisciplinary design team summarize the diversity of their learning experiences.

I have always been an independent worker... my work has always followed the standard designer/client relationship model. I was used to being the sole creator or primary creator of my work. Experiencing the participatory design process firsthand has challenged and changed my view of design. (Erik Evensen: Print Designer/Illustrator)

This project helped me see how design research can work and help designers stay focused on the end user. The toolkit needed to be abstract and structured at the same time in order to help the participants start their creative thought process. The design team's brainstorming sessions were fun, and everyone had important roles to play. (Louis Miller: Art Director and Art Teacher)

I have always designed from intuition, so I was initially skeptical about the entire participatory design process. However, during this process I learned much about the importance of human-centered and participatory design research. I now see that with the right tools, it is possible to elicit richer data from the users. (Erwin Lian: Motion Graphics Designer)

My undergraduate experience was in engineering, so I initially had a large amount of research experience, but using engineering-related methodologies. It was all data-driven, and centered around financial incentive. Now that I have seen the success that is possible with a more qualitative approach, I am eager to do more research on participatory methods. (Paul Scudieri: Cognitive and Systems Engineering)

I previously took an undergraduate design research class taught by Dr. Sanders, which gave me an interactive, user-oriented approach to design, and gave me insights into the MakeTools See/Make/Do approach. This class was my first experience with truly qualitative research. I learned that I am an observer—I document and think first, and draw conclusions later. (Erin Lucarelli: Visual Communication Designer)