

“It’s All in the Game” A board game to facilitate disease-related conversations between children with a chronic disease and their peers

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ABSTRACT

Communication about chronic disease is challenging for affected children and their peers. However, peers play a crucial role in the quality of life, reduction of disease burden, and adherence to treatment regimens of children with chronic disease. Procedural rhetoric in games shows great promise to facilitate behaviour change leading to better communication between children with chronic diseases. We followed a user-centric design process to develop “It’s All in the Game”, exploring the value of procedural rhetoric to foster disease-related communication between children with cystic fibrosis—a chronic disease that affects the lungs and digestive system—and their peers. Our work contributes to game design by showing an avenue to shape communication between peers and children with a chronic disease to potentially reduce disease burden and increase their quality of life.

CCS CONCEPTS

• **Human-centered computing** → Human computer interaction (HCI).

KEYWORDS

chronic disease, cystic fibrosis, board games, pediatrics, procedural rhetoric

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1 INTRODUCTION

For children, communicating the effects of chronic disease to their peers is challenging because directly communicating their needs often leads to misunderstandings, leads to short-term changes in how peers behave and can put a burden on the child with a chronic disease [4, 33]. The potential of board games to procedurally communicate the effects of chronic disease has received little attention. However, board games provide a low-barrier approach to learning about the effects of chronic disease by creating enjoyment-focused, family-friendly play settings that generate shared experiences, provide a structured language around chronic disease, and could enable and facilitate discussion amongst peers. Ultimately leading to attitude and behavioural change.

Cystic fibrosis (CF), for example, requires peers to understand the impact of regular medication intake and fluctuating energy levels. Due to a strict medical regime and regular hospital visits, children with CF have vastly different time constraints compared to their peers. When misunderstood, children with CF are often excluded and brought into situations where they overextend their abilities, potentially worsening their disease. A situation that is generalizable to other chronic diseases such as asthma, diabetes, and juvenile idiopathic arthritis. All have in common that the disease affects energy, time, motivation, and health.

To explore how board games can be applied to communicate the effects of chronic disease, we create “It’s All in the Game”. Following a user-centred design process, implementing insights from children affected by a chronic disease, medical experts, peers, and game designers, we created a board game around the theme of chronic disease. The game distilled insights about chronic disease into varying in-game procedures. For example, pleasurable activities such as attending a birthday party are restricted based on energy level, and random events occur to simulate the unforeseeable effects of chronic disease on daily life.

“It’s All in the Game” is a design exploration around procedural communication to foster disease-specific communication between children with a chronic disease and their peers. Procedural communication could allow children to better empathize with their peers because it puts players in situations that are regularly experienced by those with chronic diseases. Our work contributes to applied game design for health by providing a complete game including



Figure 1: A child holding a personal challenge card and two resource cards, one for motivation, one for time. The setup of the game can be seen in the background.

procedures, and rules, and the design of the game including the game board, cards, tokens, and personal scheduling boards. We also provide insights into the play experience through user and expert feedback, resulting in recommendations for designers creating board games for children with a chronic disease and their peers.

We show how applied procedural rhetoric can shape communication between peers and children with a chronic disease, opening an avenue to reducing disease burden, combating loneliness, and increasing the quality of life for children with a chronic disease.

2 RELATED WORK

Cystic fibrosis (CF) is a genetic disease that causes persistent lung infections and limits the ability to breathe over time. CF affects about 1600 patients in the Netherlands, about 560 patients are under the age of 18 [20]. The quality of life of patients with CF is determined by their conditions at home, at the clinic, and at school [5]. Acceptance of the condition can predict the well-being of adolescents and young adults with CF [7], who due to the bacterial threat of others are more prone to experiencing loneliness [1] and increased psychological burden [24]. Social support through family and friends is central for disease management [4] and reduces symptoms and the perceived burden of treatment [10].

For patients with CF, the time spent being physically active is often reduced, due to the medical demands of the disease [19]. Children experience vulnerability, loss of independence and opportunities, isolation, and disempowerment [14]. Especially social deprivation and isolation increase the psychological burden of the disease [32]. Hence, peer support plays the most crucial role [4, 10]. However, CF is complex in many ways (e.g., time-intensive medical regime, avoiding contact transfer of bacteria, effects on motivation and energy levels), which means that peers do not necessarily comprehend the implications of living with the disease. Children with a chronic disease often struggle to communicate the more complex aspects of their disease—a situation that can benefit from communication prompts [36].

2.1 Games to Support People with Cystic Fibrosis

Investigating the care system of CF, technology is primarily used for self-management, which is well aligned with patients' care needs

[26]. However, technology can also have negative implications such as heightening self-awareness through personal tracking. Taking a playful approach, games have been central to develop interventions for patients with CF [1, 18, 28, 29] and to monitor their health [30]. Games provide breathing training for patients with CF [29], support their caregiver [28], or investigate how to apply learning and motivational frameworks to game design practice aiming to inform serious game designers [18].

Board games for CF are primarily built around trivia such as in the “Cystic Fibrosis Game” [11] or focus primarily on breathing as in “Adem in, Adem uit” [12]. However, behaviour change literature suggests that direct routes of communication [23] lead more often to rejection of the intended message, while non-explicit strategies are more likely to resonate [22]. Providing arguments through game mechanics (procedural rhetoric) is a promising route to stimulate communication and behaviour change.

2.2 Procedural Rhetoric

Procedural rhetoric focuses on persuasion through rules and interactions, rather than spoken or written word [6]. Procedural rhetoric has been used for educational purposes [9], to communicate injustice, and to stimulate discourse [25, 27]. In the game Re-mission [16], for example, stool jags—hardened stool piles shaped like stalagmites found in the colon—break apart and cause damage; players can avoid the damage by using by shooting the jags, forming the argument that chemotherapy can harden stool and that patients need to be proactive by taking stool softener [15].

Treanor et al. [34] have extracted procedural meanings of gameplay using the MDA framework [13] in 2D games. They investigated micro-rhetoric's as a means to reason through the logic of a designer's intentions and to support players in validating their interpretation of gameplay [35]. Previous work has applied procedural rhetoric to behavioural change approaches investigating emerging dialogues [31], compared rhetoric and framing [8], and applied procedural rhetoric analysis to commercial games [37]. Experimental work investigated the psychological reality of procedural rhetoric [2], and found that support from traditional elements such as narrative or visual language improves the effect of the argument made through game mechanics [3]. Procedural rhetoric has been identified to have value in the communication of health



Figure 2: An overview of “It’s All in the Game” including 1) a cost card, 2) a personal game board, 3) game tokens, 4) the personal challenge card, 5) chance cards, and 6) resource cards.

problems [17], and while there are plenty of games focused on the health care context [18, 28, 29], there is little focus on stimulating peer communication to improve the social conditions of children with a chronic disease.

3 IT’S ALL IN THE GAME

“It’s All in the Game” is a multiplayer board game designed for four players who are about 12 years old or older (see Figure 2). The goal of the game is to successfully plan a week in the life of a cystic fibrosis patient. Players play with randomly drawn resource cards to acquire activity tokens, i.e., motivation, energy, health, and time, or chance cards, and try to complete their personal challenges on their personal game board. The game takes approximately 45 minutes to play. Each turn, players can choose to 1) pick two additional resource cards from a randomly drawn set of three cards or draw a random card from the resource card pile; 2) use resource cards to buy a maximum of one token per turn; or, 3) use one energy card to buy a chance card.

The game ends when the first player completes their personal challenge card or if one of the activity tokens (e.g., rest) has been exhausted. After two final rounds, players sum up the number indicated on their activity tokens and, if they have completed their personal challenge, add the points indicated on their personal challenge card. The player with the most points wins the game.

Personal Challenge Cards: At the start of the game, players blindly draw a personal challenge card, representing differences between cystic fibrosis patients. The challenge is kept secret. Personal challenge cards vary in difficulty to create variability in-game experience and create tension between players. The varying points per card create tension when counting up points at the end of the game.

Resource Cards: The game features four equally available resources: motivation, energy, health, and time. Each player receives four resource cards at the beginning of the game.

Chance cards: As a result of drawing a chance card, players either gain or lose resource cards, e.g., “That’s unfortunate! You didn’t take enough Creons at dinner. Now you have to pay 1x health”, are allowed to trade with other players, or can move tokens on other players’ personal planners. Should a player not have enough resources the chance card has no effect.

Personal Game Board: The Personal Game Board features three activities per day for seven days. The different tokens (Rest, Regular, and Strain) have different shapes to physically represent limitations in calendar planning and reinforce the rhetorical procedure of planning with a chronic disease:

Coloured Tokens: The game features *rest tokens* (white; costs: 1x time card; points: 1), which only require time and fit anywhere on the board. *Regular tokens* represent medication intake (red; costs: 1x time card, 1x motivation; points: 3), school work (orange; costs: 1x time card, 2x motivation cards; points: 3), and social events (yellow; costs: 1x time card, 2x health cards; points: 3). Social events are resource expensive but can be placed anywhere on the board. *Strain tokens* represent physiotherapy (green; costs: 1x energy, card 1x health card; points: 4) and sports (blue; costs: 2x energy cards, 1x health card; points: 5). Players can either place a physiotherapy or sports token on a single day, to reinforce the limitations chronic disease imposes. Physiotherapy tokens can only be placed during workdays. Strain tokens can only be placed in the morning and noon slots because strain tokens require a rest token to simulate recovery needs.

4 DESIGN PROCESS

Designing “It’s All in the Game”, we followed a player-centric approach frequently involving players of different ages with and without cystic fibrosis. During the design process, we differentiated between representing the implication of cystic fibrosis correctly, the general playability of the game, and the communication value of the game. When designing “It’s All in the Game”, we first discussed

guiding principles for the design and our personal values. In our work, we focused on 1) game enjoyment—a game that’s not played because it is not fun is therefore useless for stimulating communication; 2) visual and aesthetic appeal—we wanted to create a game that people genuinely like to interact with; 3) separation between disease and person—we aimed to stimulate communication about the disease and not about individuals affected by cystic fibrosis. We explicitly did not aim to stimulate empathy, teach people facts about cystic fibrosis, or suggest any form of action—our design goal was to provide people affected with cystic fibrosis and their peers to talk about cystic fibrosis, have vocabulary like motivation and energy available, to be able to refer back to procedures that, for example, have a trade-off in how energy is used and how rest needs to be planned for.

At the beginning of the process, we remotely interviewed four patients with cystic fibrosis. We learned that patients struggle to explain the non-visible aspects of their disease, that peers of CF patients tend to find it hard to grasp the chronic nature of the disease (e.g., by asking if patients are better after hospital treatment), and that planning is crucial in the disease management of CF patients. While developing and iterating on the design of “It’s All in the Game”, we focused on these aspects to ensure that they found representation in the game.

Game aspects that were directly related to the representation of living with a chronic disease were developed with the involvement of children with cystic fibrosis. This includes early feedback on the conceptualization of CF proposed for the game, interim feedback of game play and communication value by children with CF and their families, and a final round of testing by a child with CF and their peers. Considering the low number of cystic fibrosis patients in the Netherlands [20], we decided on this design process and involvement from others because it struck a balance between user involvement, risk-management for children with cystic fibrosis, and requirements for user-centred design.

4.1 Playability

To evaluate playability, we had play sessions with different age groups (i.e., children, young adults, and students) and social configurations (e.g., peers, friends, family). We primarily relied on observation and semi-structured interviews to drive the design process. During observations, we focused on comprehension of rules (e.g., are people grasping how to play the game), fluency in interactions (e.g., are people intuitively following the game procedure), communication among players (e.g., are players chatting about health-related aspects of the game such as energy), game enjoyment (e.g., laughing, smiling), and the onset of boredom (e.g., when initial play excitement dies down). The post-play interviews focused on observations made during game play such as players’ interactions with the game board, a specific discussion focus during game play, and thoughts on replayability.

Our approach prioritized getting the general game design right before involving the target user group. We decided to not frequently test with children with cystic fibrosis, because we wanted to assure that children with cystic fibrosis are not put at risk for testing that can be conducted with people without a condition; e.g., testing of game mechanics and general play comprehension. The game

was tested weekly with a fixed group of players with board game experience. Once a stable, enjoyable version was achieved, the game was tested with healthy children of the target demographic (12–18 years). The final playtest was conducted with children with cystic fibrosis and their peers.

5 PRELIMINARY RESULTS

Iteratively testing our game spawned several insights that are relevant for the design of games aiming to facilitate procedural learning. Players had no prior knowledge about cystic fibrosis. After the play sessions, we asked players about insights they gained while playing the game.

One participant without CF commented “Planning your day with chronic disease is a challenge so this was a little bit of an eye-opener”—the participant was referring to the planning required on the personal board. Purchasing tokens using different resource cards and filling the calendar seemed to have had the intended effect. This is evident in other players’ comments such as “It’s a lot of balancing and deciding between multiple things you want to do/have” or “The complexity of their [children with CF] planning and how much energy simple tasks probably take”. Commenting on the energy use shows that beyond learning about scheduling participants also picked up on the limited resources that children with cystic fibrosis have available.

It also came across that not just the planning is difficult, but that in general there are plenty of considerations for children with cystic fibrosis—specifically, that the implications of daily activities are more far-reaching than for their healthy peers. Participants commented, “Yes, there’s a lot of things to consider during the day when you suffer from CF and this game gave some small insights into that,” and, “That it’s very complicated to have cystic fibrosis. It seems pretty tough.”

5.1 Insights from Peer Play

In our last playtest, two 12-year-old children without cystic fibrosis played the game with their school friend who has cystic fibrosis. After picking up a chance card introducing Creons—pancreatic enzymes used to treat pancreatic insufficiencies common for patients with cystic fibrosis. The child who drew the card asked for the first time what Creons are—the children had known each other for more than 8 years. The child with CF replied “Really? I take those 100 times a day and that name is written in huge letters on the box! How can you still not know what they are?”

The interaction gives insights into three aspects of peer communication and how game play can help to shape communication between children with a chronic disease and their peers. 1) Interacting with unknown terminology when playing results in curiosity about the terminology; it is not uncommon for games to introduce terms, e.g., med-kits or potions, which allows people to investigate their meaning. Children with a chronic disease need to learn the medical terminology early on, which is not necessary for their peers. Simply being exposed to the terms spawns conversation. 2) The example shows that despite being peers for a long time, the impact the disease has on children, in this case with cystic fibrosis, is not recognized by their peers. It requires a deliberate prompt to shift the focus towards disease-related topics such as medication intake.

3) Children with CF do not necessarily talk about their disease with their peers—even after 8 years, the child never saw the need to talk about medication with their peers.

6 DISCUSSION

The development of "It's All in the Game" illustrates the tension between applying game design to address societal challenges, while primarily creating an enjoyable play experience. We intentionally steered away from developing a game that directly conveyed information about a chronic disease. Rather, using a user-centred design approach we developed a game that allows children to procedurally engage with the implications of cystic fibrosis, and encounter the facts, treatments, terminology, and physical limitations caused by the disease as a side effect of play.

When reflecting on the development of "It's All in the Game", we found that capturing the implications of chronic disease in game play had several challenges such as the translation of aspects of the disease into procedures, the representation of disease, and the tension between designing for behaviour change while not emphasizing empathy.

6.1 Representing Disease

There is little knowledge about the effects of play, and play as a communication device among children with a chronic disease and their peers. Hence, there is little to draw from when designing in this space. We build on prior knowledge about general game design, background research, and interviews with children with chronic diseases. We found that by preserving the players' voices while aiming for a level of polish that comes close to commercial products, we faced challenges affecting the voices of the children who should benefit most. We found that the largest risk is making trade-offs that potentially dilute the design vision, e.g., by reducing the complexity of weekly scheduling and energy use to a personal schedule board and energy cards, the nuances of recharging energy, unexpected events, and individual differences get lost. We felt that providing means to prompt these different topics through chance cards and personal challenges is a sufficient approach to capture some of the complexity, but designers need to be aware that game play quickly becomes an abstraction of the actual disease resulting in a general representation of the disease, lacking nuance.

6.2 Challenges of Designing for Procedural Rhetoric

The elements of procedural rhetoric in "It's All in the Game", are the scheduling on the personal playboard, the implications of random events during a week, the trade-offs between using different resources for different activities, the requirement of rest after physiotherapy and sports, and the individual challenges children with cystic fibrosis face.

When designing "It's All in the Game", we experienced tension between integrating different game dynamics, balancing game enjoyment, and staying within the theme of the game. It becomes a challenge not to overemphasize one procedural aspect, but to provide sufficient individual space to investigate players' responses. For example, we had doubts that chance cards would be read out loud, but we also didn't want to force players to read the cards out

every time and highlighted the actionable aspects of the card, e.g., draw one motivation card. However, in our play tests, players read out cards suggesting that despite their functionality they contribute to communication among players.

The example highlights that the demarcation between procedural rhetoric and explicit language use quickly becomes fuzzy. Using icons or text in-game makes a difference in communication, but the use of text is not strictly speaking part of procedural rhetoric. However, we made design decisions such as keeping text on our tokens to influence the terminology used during exchanges. Our goal is to facilitate communication between participants with a chronic disease and their peers and consequently shape language. Due to the focus on communication, we found it important to provide structured terminology during interactions between players.

6.3 Negative Implications

Providing a game-based approach to support children with a chronic disease to stimulate communication with their peers has the potential to lead to increased peer awareness and hence to better peer support. However, providing children and young adults with insights into a disease does also come with risks; e.g., the terminology might be used against the child, children might become overprotective, or children might find aspects of a disease challenging to deal with leading to distancing themselves from their peers. We believe that communication about diseases is key to creating awareness and providing support, however, the context, social climate, and social situation of children need to be considered and potentially require support by parents and educators.

6.4 Limitations of Empathy

When working with populations that seem to require an advanced understanding of someone else's situation and potential feelings, we are confronted with questions about empathy. Previous work has outlined how empathy is limited because just understanding and feeling for someone does not translate into behaviour change [21], i.e., compassion. To better understand if "It's All in the Game" can foster compassion, we aim to evaluate our work-in-progress by investigating uptake, effects on communication, and receiving support within a small sample of children with cystic fibrosis. The project will be carried out in collaboration with a partner clinic in the Netherlands and aims to provide "It's All in the Game" to children with CF.

7 CONCLUSION

We contribute insights into our development process of "It's All in the Game", initial insights from play sessions, and a description of the rules and resources used to play the game. Our work is still in progress, but we believe that "It's All in the Game" provides a platform to further investigate the advantages and limitations of procedural rhetoric when educating peers about the implications of chronic diseases. Leveraging the power of play opens opportunities for communication, avoiding direct-information-driven communication, but allowing people to explore a topic, facilitate discussion, and through procedures get a sense of the limitations of others. By designing a game to facilitate communication between children with chronic disease and their peers, we have investigated cystic

fibrosis, a common component affecting quality-of-life of children with a chronic disease, and developed a game ready to be taken further by children with chronic disease, their peers, family, and caregivers. Our work demonstrates the potential of applied procedural rhetoric in shaping communication between peers, showing an avenue to contribute to reducing disease burden, combat loneliness, and increasing the quality of life for children with chronic disease

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