Movers and Shakers: Designing Meaningful Conflict in a Tablet-Based Serious Game

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Abstract
Movers and Shakers is a two-player tablet game that explores how subversive game design elements can foster meaningful conversational conflict in a serious game. It relates recent insights into recursive and transformative learning theories to a game prototype that can be used as a research tool to explore how social design can influence serious game experiences. In this paper, we outline the game's theoretical foundations, highlight its central design elements and outline the research design for a study on the impacts of the game on the communication flow of its players.

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Game Design; Player Research; Serious Games; Tablet Games; Mobile Learning; Game Evaluation

ACM Classification Keywords
H.5.m [Information Interfaces and Presentation (e.g. HCI)]: Miscellaneous;

Introduction
While the design and development of large-scale serious games reaches back more than fifty years [1], the *digitization* of such games has stirred new hopes in the educational and political communities over the last decade. Playful digital learning environments promise

Serious Games*:*
Serious Games are playful environments that are intentionally designed to have a puposeful impact on the players' lives beyond the self-contained aim of the game itself. [9]

Subversive Game Design:
The subversion of common game design elements through conflicting uncommon design patterns that challenge the players' expectations.[10,11]

Recursive Learning:
A circular process of restructuring and adjusting prior experience patterns through experiences of constructive disappointments and confrontations.[10,11]

Transformative Learning*:*
Learning on a transformative level implies the development of new perspectives on the world, others, and ourselves through the adjustment and revision of old experience patterns and the development of new ones on their basis.[7]

to be highly engaging, loaded with compelling content and suitable for college-age students. While informational or behavioral learning outcomes have been researched widely and interesting results can be found [14], *transformational learning* impacts of serious games are more or less unexplored [8]. Whereas informational learning focuses on knowledge acquisition and facts, transformational learning implies perspective changes and the revision of prejudgments and belief systems. That we know little about how players change their perspectives through games is problematic, as these games are designed intentionally to have an impact and change perspectives on social issues.

Most serious games are single-player, online games that lack a social component within the the design. This means many games focus on social change [5], though only thematically—not in the actual gameplay. Thereby the question arises whether the integration of social components fosters the transformational learning process of the players of serious games. This question is the starting point of a theory-based design project called *Movers and Shakers* [12, figure 2]. In it, we shift our focus beyond learning as a rational process to *recursive learning* through failure by resolving incorrect expectations [7, 8, 10, 11]. From a theoretical stance, games appear to be ideal environments for recursive learning, because learning through failure is at the core of most serious game frameworks [2, 16]. But what if the subversion within the game is not initiated by a non-player character (NPC) or the system itself—but instead by another co-located player who, in turn, experiences the other player as a subversion of his or her goals? How do players cope with such a conflict, and what if the only way to solve the problem is to start an actual conversation outside the tablet screens?

Serious Game Design

Before outlining the design, it is important to define how we interpreted the term "serious games" in the design of *Movers and Shakers*. Serious games are purpose-driven playful environments intended to impact players beyond the self-contained aim of the game. Entertainment-oriented games can be "serious," or even spark conflict and collaboration, but they are not designed intentionally to have a transformative learning impact on their users. Serious games are designed to offer a playful environment that provides "serious" content, topics, narratives, rules and goals to foster a specific purposeful learning outcome. A handful of serious game design approaches exist [2, 9, 16], but our design is based on a framework that focuses on how a game's purpose is channeled through the game design process. The "Serious Game Design Assessment Framework" or SGDA Framework [9] attempts to offer a framework to explore the formal conceptual design of a serious game in relation to its explicit and implicit purposes (see Figure 1).

In creating *Movers and Shakers*, we explored how a multiplayer component could be added to encourage deeper critical engagement. To test these theories, we created a two-player tablet game that incorporates subversive game design elements [10,11], meaning that, while a player works toward individual goals that often conflict with those of the other player, she must still collaborate to complete a larger, shared goal. We wanted to design a game that requires the players to share these differing perspectives beyond the screens if they want to win the game.

Our process involved five fundamental steps: (a) developing a theoretical framework, (b) applying the

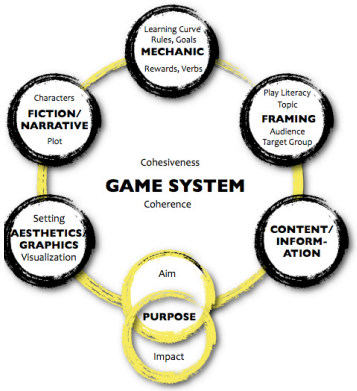

Figure 1: SGDA Framework [9]

Figure 2: Poster for Movers and Shakers (2012) [12]

theory to game design, (c) exploring comparable serious games, (d) developing a prototype and the final game with a team of students and (e) evaluating how well the game meets the theoretical standards. The three leading questions of this process were:

1. *How can subversive game design elements be implemented in a two-player tablet game?*
2. *Are players able to start a conversation beyond their tablet screens to solve the game's problem collaboratively?*
3. *When do players engage in an actual conversation, and how does their interpretation of the other player shift because of that?*

To answer these questions, we designed *Movers and Shakers*, a serious game for two tablets, outlined in the next section.

3. Case Study: Movers and Shakers

The purpose of *Movers and Shakers* was to introduce young workers—high-school or college graduates just entering the workforce—to some of the contradictions and communication difficulties inherent to a workplace, to show them the challenges and advantages of differing perspectives, and to encourage them to reach out and communicate with their fellow player outside of the channels provided in the game. *Movers and Shakers* explores the conflicts between the high-level executive, whose goal is to get as much overall work completed as possible, and the floor manager, whose goal is to keep the office running and the workers working together. As a game, it aims to create meaningful conflict between the players, who then come up with ways to work with or against each other.

Narrative, Mechanics and Rules

The two players oversee a machine that keeps the world spinning at the proper speed. One player seeks to keep the machine running at a high temperature; the other keeps the employees content with their work environment. The introductory narrative for the two players is similar, but not identical. This reinforces their different points of view, while insuring they understand the mutual goal.

The players of *Movers and Shakers* share a similar game-playing experience, with only a few critical differences. Both players are tasked with the goal of keeping the world rotating at the correct speed; both players can see where the sprites are working; and both players draw from the same vat of lava to fuel their actions. Their turns take place simultaneously, allowing them to work with or against each other, or even race to use up all the shared resources before the other player.

The players do not have the same information available in game, however—nor do they have the same abilities. Most important, they each also have their own private goal to complete in order to win the game, and the actions each player can take in game are those that best enable their private goal. At the same time, those actions also affect the overall goal—maintaining the speed of the world. Representing the high-level executive, the first player can 'hire,' 'inspire' and 'fire' sprites (figure 5). Since his goal is to get as much 'work'—or heat—out of the sprites, this player can choose to hire the most effective sprites, and can also force them to work harder. The hiring player chooses each worker's initial placement. This player can also use lava to enlarge the sprites, causing them to 'work'

Figure 3: Tablet interaction while playing Movers and Shakers [12]

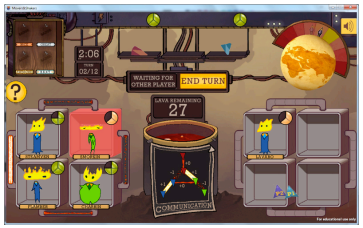

Figure 4: Floor Manager perspective in Movers and Shakers [12]

Figure 5: CEO perspective in Movers and Shakers [12]

harder, making more heat, and thus increasing the machine's temperature.

The second player (figure 4), representing the floor manager, can rearrange the sprites' position in relation to other employees to help them work more efficiently and effectively together. The player spends lava to improve communication between sprites, in turn improving morale. When sprite morale is high enough, the manager receives a badge; this player's private goal is to achieve four badges. Happy workers make the world spin faster; unhappy workers slow it. Overworked sprites are never happy, making the manager player's job harder; at the same time, a moved sprite loses all 'inspiration' the executive player has poured into it. Thus, the two players are continually thwarting each other by attempting to optimize their own personal game.

These mechanics set the players in deliberate, direct conflict with each other, but the game itself requires cooperation or else both sides lose. For example, the executive can overwork the employees to quickly increase the total work completed; however, this will lead to the machine running far too fast and the world spinning out of control. Similarly, the floor manager can overcompensate in trying to create a productive work environment, causing the machine's speed to increase. It is only through striking a balance between individual goals and the overall goal that the game can be won; if individual players act only in service of themselves, they put the entire operation at risk.

The game itself provides no built-in communication channels for the two players, but each player can see the results of the other player's actions on screen. Because the physical setup is face-to-face, all a player must do is break out of the game long enough to start speaking with the other player.

Early Findings

Movers and Shakers was designed in an iterative process that included weekly play-tests with external lab affiliates and two "open house" sessions for members of the public, each of which attracted about 50 players. Because outside testers were brought into the process as early as the paper prototyping phase, many usability concerns were eliminated before building the digital prototype.

These testings also provided anecdotal evidence on how small narrative cues can impact players' understanding of the game's goals. For example, when an early version of the game referred to the other player as "the opponent," players were more reluctant to collaborate and often hogged the shared resources. The game now uses neutral terms, allowing the players to develop their own understandings of each other's roles.

Future Work

In designing games for social change, creating opportunities for critical play and reflection is crucial. Unfortunately, most of the serious games produced are single-player experiences, and are not meant to be played in a social setting. The design of *Movers and Shakers*, on the other hand, requires that two physically co-located players share a local network to play. While this setup presents additional challenges in staging the game, it nonetheless creates a more ideal environment for dialogue between players, both during and after the game. Including a post-game debriefing session as a core part of the game experience gives

players adequate time to "share, cross-fertilize, and to generalize their learnings from and between all who participated in the same experience" [3]. The game itself helps players internalize the rules of the system, work within those rules, and come to terms with their in-game roles. The competitive and sometimes frenzied nature of the game, however, does not leave much opportunity for reflection as the game unfolds. Putting the tablets away and debriefing provides a more focused opportunity for players to make real-world connections based on their gameplay experience.

In other contexts, tablets have been shown to positively augment large classroom discussions, providing an alternative, text-based backchannel for students who would not have otherwise contributed to the discussion [4]; however, Turkle argues that mobile devices merely distract us from the people around us [15]. In fact, the mere presence of a cell phone in a room can negatively impact both conversation quality and feelings of closeness and connection between speakers [13]. In further study of *Movers and Shakers*, we aim to discover whether tablet use in a serious game creates feelings of a shared game space that encourages collaboration, or a private one that encourages secrecy.

And finally, we wish to better understand how players internalize the game's serious message about the workplace—if at all. We believe a well-designed serious game should follow the maxim "show, don't tell" in delivering its message; however, it's possible that *Movers and Shakers*' message is obscured by the game's mechanics and fictional universe. Do players understand the game's serious meaning, and, if so, do they find it effective?

Study Design

To further study *Movers and Shakers*, we are conducting controlled playtests with 10 pairs of players (20 players total) within the game's target age range of 18–25. Players for the study will not be previously acquainted, and will be recruited to include a balanced gender ratio. We are pairing unfamiliar participants because we want the game—rather than previous acquaintance—to drive communication.

Players are seated face-to-face (with no table between them), each with his or her own tablet. They are asked to play through the game, which takes about 25 minutes. During gameplay, one researcher observes each player's gameplay and interactions. Observing how players position themselves physically in relation to the other player will lend keen insights into how they interpret the goals of the game. Do players hold their tablets so the other player can see it—thus encouraging information exchange and collaboration—or do they hide their tablets? We are also recording conversation during gameplay to better understand how (and when) players coordinate during the game. If and when the players communicate, do they use language that suggests collaboration?

After completing the game, the researchers lead a post-game discussion. Participants are then asked to play the game a second time to see if having a targeted discussion about the game affects communication. Finally, players discuss how their strategies changed between the first and second games plays. With this data, we can identify common play strategies and discussion points that speak both to the effectiveness of *Movers and Shakers* in delivering its serious message about the workplace, and the effectiveness of tablet-

based games in coordinating collaboration between co-located players.

Conclusion

As the use of tablets becomes more widespread, especially in educational contexts, understanding best practices for building effective face-to-face serious gaming experiences to crucial. Building upon the affordances of mobile devices, subversive games that create meaningful conflict between players may be the key to encouraging more engaging and critical play, though more research is needed. *Movers and Shakers* offers a unique approach to serious game design by using subversive game design to provoke a shift from a competitive goal-orientation to a collective problem-solving mode through conversations beyond the tablet screens.

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