

Distributed Letter Jam: Designing Distributed Board Game Play for Social Connection

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Playing board games together is a fun way for people to connect with friends and family, but social board game play can be challenging when people can't get together in-person. Using a Research through Design approach, we explored possibilities for enabling social distributed board game play amongst friends and family. We developed a video prototype of game play for a distributed version of Letter Jam. Through reflecting on this prototype, we discuss challenges for the design of distributed board games, including incorporating tangible inputs and accommodating a variety of household configurations. We also identify a set of design qualities, including *spatiality*, *tangibility*, and *presence*, that can inform the design of systems for social distributed board game play.

1 INTRODUCTION

Shared leisure activities help us maintain our relationships with family and friends [26]. Board games are a popular leisure activity [12,15] and the social aspect of gameplay is part of the fun for many players [15]. While coming together around a table for a "game night" can be an enjoyable way to spend time with friends and family, it's not always feasible to play games in-person. Friends and family who are physically distant must turn to distributed board game play and the improvised use of video conferencing systems instead. During the Covid-19 pandemic, people who tried connecting with friends and family by playing distributed board games reported lower feelings of social connection than when playing in-person [13]. Similarly, a limited sense of co-presence—the feeling of being with and aware of remote participants—is a known challenge for distributed systems that help groups collaborate and connect over distance [38].

Existing systems for playing distributed board games generally don't include physical components [3,7,36], which are an important part of the experience for many players [30,41]. The few exceptions to this [32,40] haven't been examined with the social experience of gameplay in mind. Research has explored physical board games augmented with digital elements (e.g., [2,18,34]), which can provide useful examples of technologies that might enable distributed play, but the focus of these games has been co-located play. Research exploring how to design board games themselves for distributed play began only recently, and there remains much to be learned [21]. Overall, there is a lack of research on how to design technologies that support the social experience of distributed board game play.

To address this gap, our research aims to better understand how we might design a system to help friends and family connect by playing board games together over distance. Using a Research through Design approach (e.g., [43]), we

created a video prototype demonstrating game play for a distributed version of the game *Letter Jam* [32]. In this paper, we reflect on our design process and identify some of the challenges of implementing a system for friends and family to socialize and play distributed board games, including synchronizing tangible elements and accommodating differences between households (e.g., number of players, technologies available, space for play). Using our prototype as an example, we discuss qualities such as *presence*, *spatiality*, and *tangibility*, and explore how these can inform the design of a system for distributed board game play that emphasizes social connection between players.

2 RELATED WORK

Currently, people take a wide variety of approaches to playing distributed board games. Some groups combine general-use video conferencing and communication apps like *Zoom* or *Discord*, with digital board game apps like *Board Game Arena*, *Tabletop Simulator*, or *Colonist.io* [13]. Some groups improvise by streaming video of a board state that is maintained in one household, and having remote players verbally ask to have their pieces moved [39]. Notably, none of these systems integrate with physical components across households, which is an important part of the board game experience for some players [30].

Some companies and researchers have designed Augmented Reality board games that blend physical and digital elements, with options to play over distance. For example, *PlayTogether* is a system that superimposes a projection of the remote player's pieces and forearms onto the local board to enable distributed play [40]. *Tilt Five* is an augmented reality tabletop game system that is still in development at the time of writing, but when released will offer distributed gameplay that integrates digital and physical game components [32]. Interestingly, neither of these examples provide remote player avatars or video, which may affect a person's sense of connection to remote players [36], and the impact of their designs on the social experience of play is not well-understood.

With regards to blending digital and physical game play, HCI researchers have designed and tested numerous augmented board games. These hybrid digital-physical games combine aspects of video games and board games to enhance the player experience [19] or enable new types of game mechanics [34]. For instance, Molla and Lepetit have demonstrated how computer vision can be used to track pawns on a Monopoly board [24]. Mora et al. created an augmented version of the cooperative board game *Pandemic* using interactive tokens with LCD screens and cards with scannable barcodes [25]. Spielberg et al's *RapID* framework uses RFID readers to track the game state in an implementation of *Tic-Tac-Toe* [35]. Other examples include tabletop touch screens that enable player interaction with the game surface [2,16] and projection-based augmented reality that creates digital effects around game pieces [8, 29]. However, these examples were designed and tested with co-located game play in mind. Design lessons from these augmented game systems may apply to distributed board games, but there are also likely to be additional considerations for supporting distributed play.

Overall, existing distributed board game systems leave the topic of how to design for the social experience of gameplay relatively unexplored. Existing research provides limited guidance on how to design distributed systems that preserve the tangible elements of board game play while fostering feelings of social connection amongst players. This is the focus of the current paper, which shares lessons we learned while designing a video prototype of such a system.

3 APPROACH

We used a Research through Design (RtD) approach for this work, by applying the tools and methods of design to the production of knowledge [42]. RtD is well-suited to investigating a problem space, generating new possibilities, and

contributing to a conceptual or theoretical understanding of the topic through application [43]. Our choice of approach reflects the preliminary nature of work in the distributed board game space [21].

Research through Design can also leverage the perspective of the designer and the first-hand insights that emerge from reflexively engaging in the design process [27,28]. The first author regularly plays distributed board games to connect with friends and family across Canada. Drawing on this personal experience added rich context to our design insights and helped us traverse the design space.

To begin, we explored the design space of distributed board game play by creating a Design Workbook [11]. We generated over twenty-five design proposals documenting ideas for design features, which “suggest important issues, approaches and options that might be considered in designing for a given situation,” [11:1]. The ideas explore topics like how to represent players, how to track game information, and how to promote socialization. The proposals experimented with a variety of technologies (e.g., projection, video, augmented reality, connected things) and games (e.g. Euro games, card games, party games). See Figure 1 for sample design proposals.

To explore promising ideas further, we created a low-fidelity video prototype that demonstrated a system for distributed board game play in-use. The goal of the video prototype was communicating the system’s features and enabling reflection on its design qualities. The prototype did not include any technical implementation or enable actual interaction across households, but had a high level of visual refinement and rich interactivity [22]. It enabled us as designers to think through the game play in detail and physically experience the proposed interactions between the user and the system. We chose to implement the prototype with a specific game to examine particular gameplay interactions in detail. *Letter Jam* [32] was chosen because it is a cooperative game for 2-6 players that is well-suited to social play amongst friends and family [1,5,6,20]. *Letter Jam* also involves mechanics that rely on player positions, hidden information, and card assignment, which gave us the opportunity to explore these issues in the prototype.

FaceTokens



ZooMinis



Audio Toggle

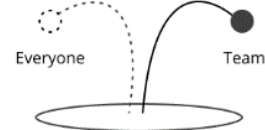


Figure 1 (left to right): *FaceTokens*, live player videos used within the gameboard as player tokens; *ZooMinis*, connected robots that synchronize the movement of miniatures across two locations; *AudioToggle*, a swiveling microphone with an embedded switch that can be swung back and forth to speak with the whole play group or “whisper” to one’s team.

4 DESIGN OF THE PROTOTYPE

In *Letter Jam*, each player receives five letter cards that form a mystery word and must guess what their word is. The core gameplay involves solving fill-in-the-blank word puzzles to guess each letter in your word (e.g., you could get the clue “l_tt_r” and guess ‘e’). Each player shows a letter card from their word to the other players without looking at it themselves. Then, players take turns placing numbered tokens in front of the letters they can see to spell a word, which acts as a clue for the other players. A full explanation of the game’s rules can be found at [9]. We created a prototype of

Distributed Letter Jam by adapting the existing game of *Letter Jam* for play by family and friends over distance. Our prototype added several new features.

Separate individual and household displays. In Distributed Letter Jam, each household uses a large, shared display to see players in other households. Individual players use a mobile device to show their active letter to those within their household (Figure 2a). Using individual devices makes it possible for game information to be hidden from players in the same household.

Ordered remote player videos. The system enables tangible input by using RFID readers and RFID-tagged game pieces. Each household has their own RFID-tagged letter cards and number tokens. During setup, players use the number tokens to map a local RFID reader to each remote player video (Figure 2b). People see remote players’ video feeds arranged in an ordered row across their shared household display. This means there is a clear turn order, and there are areas on the tabletop that correspond to remote players because they are “in front” of those players. To pass a card to the player across the table, you must physically move it in their direction and onto their RFID reader.

Overlaid game information and player video. To start the game, players each compose a word from the letter cards for the neighbouring player to guess. They tap one card from the word on the RFID reader of the neighboring player, and the letter appears overlaid on that player’s video (Figure 2c). As players look at the game information, their attention is directed toward the video representations of remote players.

RFID readers and RFID-tagged tokens. To give clues, players place number tokens on RFID readers to indicate players’ letters and spell a word (Figure 2d). The use of RFID-tagged tokens preserves the tangible nature of handing out clues. People try to solve the clue and guess their letter. When they do, they can ask their neighbour to pass them another letter card. The game continues until everyone has guessed all five of their letters and unscrambled the resulting word.



Figure 2: a) devices set up to play letter jam; b) mapping player video to RFID readers; c) a shared household display with cards overlaid on player video; d) placing number tokens on RFID readers.

5 DESIGN EXPLORATION AND LESSONS LEARNED

Through the process of creating design proposals and acting out gameplay with a non-functional prototype, we identified learnings that can inform the design of future distributed board game systems. Here, we articulate those learnings and discuss how we applied them to our prototype.

First, we explored several challenges of distributed collaboration as they apply to distributed board game play. **Synchronizing tangible elements across households is a difficult technical challenge** [14] and will require careful consideration for any distributed board game. In our prototype, our solution for tangible play required each household to have their own copy of the game, which has implications for access and sustainability. Procuring multiple copies may be too great a hurdle for those looking to engage in a casual social activity. Introducing duplicate physical components or technologies (e.g., the RFID readers) specific to a single game may be considered wasteful.

Accommodating various household configurations is another challenge designers will need to overcome, as the number of players per household and the technology they have access to may vary. For example, a single person can easily interact with a laptop, while the same interaction would be awkwardly crowded in a household of three or four. In the system prototype we created, this problem manifested when two players each set up a phone to display their letters, but one player had a larger phone that was awkward to reach around.

Our prototype of Distributed Letter Jam also illustrates several design qualities for distributed board game systems that promote social connection. For one, systems should **draw attention to remote players and focus on enhancing the quality of presence**. The importance of presence guided our choice to overlay game state information and player video. Encouraging players to look toward remote player video may promote feelings of co-presence with remote players, since improving awareness of remote collaborators is thought to improve presence [36].

As well, systems can **preserve tangibility to retain positive qualities of analog board games**. In our system, the combination of RFID readers and tagged pieces gave players the satisfaction of interacting with physical tokens. This can also support player cognition by giving them an easy-to-manipulate external aid [31] for tasks like arranging letters to make words. The tangible interface could be easily shared by multiple people grouped around a household display. This has the potential to promote more co-located player interaction than if players joined only on separate devices [8].

Lastly, systems can **leverage spatiality by preserving the order of player representations across households and imbuing actions with spatial meaning**. In our prototype, we displayed player video in an ordered row and mapped RFID readers to those videos to ensure that common game play actions like “pass cards to your left” would still apply. We also preserved the meaning of gestures. For example, giving a card to a remote player using the prototype system closely mimics how the player would perform this action in-person—they extend that card in the player’s direction. Using this kind of direct input can reduce cognitive load and feel more intuitive or natural for players [23].

6 CONCLUSION

In this paper, we describe a system for connecting multiple households to socialize and play Distributed Letter Jam together. We contribute a set of design qualities for distributed board game systems and insight into the challenges of this design space. The contributions of this work were developed from interactions with a lo-fi prototype with a single game, and they are situated within the authors’ experiences of social connection and distributed board game play. These limitations suggest future work to build a functioning prototype that enables game play for multiple board games, as well as work conducting a user study to better understand player experiences with distributed board game systems.

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