

# Tabletop Games in the Age of Remote Collaboration: Design Opportunities for a Socially Connected Game Experience

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Prior research has highlighted opportunities for technology to better support the tabletop game experience in offline and online settings, but little work has focused on the social aspect of tabletop gaming. We investigated the social and collaborative aspects of tabletop gaming in the unique context of “social distancing” during the 2020 COVID-19 pandemic to shed light on the experience of remote tabletop gaming. With a multi-method qualitative approach (including digital ethnography and in-depth interviews), we empirically studied how people appropriate existing technologies and adapt their offline practices to play tabletop games remotely. We identify three themes that describe people’s game and social experience during remote play: creating a shared tabletop environment (*shared space*), enabling a collective understanding (*shared information and awareness*), and facilitating a communal temporal experience (*shared time*). We reflect on challenges and design opportunities for a better experience in the age of remote collaboration.

**CCS CONCEPTS** • Human-centered computing • Human computer interaction (HCI) • Empirical studies in HCI

**Additional Keywords and Phrases:** Tabletop games, Remote play, Social connectedness

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## 1 INTRODUCTION

Social isolation is a strong risk factor for people’s health and well-being [44]. Strong social connection and support help strengthen one’s immune system, and leads to an increased chance of longevity [42]. Friends and family play an important role in these social relationships, as they provide a variety of support in the forms of assistance with routine activities, comfort and companionship among others. Individuals who frequently interact with friends and family are more well-positioned to cope with physical and mental health issues as well as serious life problems [86]. The diversity

and scope of migration and geographical mobility have increased as part of globalization processes. However, as individuals and families move to seek better livelihoods, they may also be moving away from family and friends.

In the time of the coronavirus disease 2019 (COVID-19) pandemic, social distancing rules further intensified social isolation and loneliness, leading to serious consequences such as a staggering number of excess deaths due to Alzheimer's and dementia [92]. Due to the highly contagious nature of the coronavirus, all 50 states of the United States, as well as many other countries issued social distancing orders, limiting social activities, gatherings, and entertainment to prevent further spread of the virus. How to stay connected while socially distancing becomes the new challenge that everyone has to face. Some events can be moved outdoors if weather permits, such as yoga classes and small social gatherings, but the majority of social activities are moved online via communication and collaborative technologies.

Tabletop gaming (e.g., boardgames, tabletop role-playing games, card games, tile-based games) is also affected during the time of social distancing. Among in-person social practices, tabletop game is a common pastime among family and friends. To understand how people manage to move their offline tabletop gaming sessions online and the impact of technology usage on their game and social experiences, we conducted a qualitative study combining a three-month online observation and in-depth interviews with fifteen participants. We plan to answer the following research questions:

- **(RQ1)** How did people appropriate existing technologies and adapt their practices to play tabletop games online when offline play was not available?
- **(RQ2)** What socio-technical factors affected people's online tabletop gaming and social experiences?

Contextualizing our research in studies of collaborative technologies, we aim to use our findings in tabletop games to inform the design of future activity space and contribute to collaborative technologies in the social settings.

In the following sections of this paper, we begin by summarizing prior works on technologies that support adults' social connectedness with families and friends, gaming for social connectedness, and collaborative technologies to support shared task space. We describe the context of the COVID-19 pandemic and quarantine to provide background information about our research. We then describe our qualitative multi-method approach, our participant observation, and semi-structured interview process. In the findings section, we present three themes that emerged from our analysis which capture people's game and social experiences during remote tabletop gaming. We conclude this paper by discussing design implications for collaborative technologies that support remote play for social connections and addressing the limitations of this work.

## 2 RELATED WORK

In this section, we review previous works in technologies that support adults' social connectedness with family and friends, and games that cultivate social connectedness. We also highlight prior literature in collaborative technologies for shared task space, in order to situate our work in the larger context of collaborative technologies.

### 2.1 Technologies for Adults' Social Connectedness with Family and Friends

The HCI community has investigated the impact of technology on people's social connectedness in various contexts. Family (e.g., [52,53,80]) and friendships (e.g., [15,89,74]) are the two major relationship contexts researchers have been studying. The majority of the prior literature investigating the context of family focuses on supporting connections with children, such as parent-child relationships (e.g., [31,60]) or grandparent-child relationships (e.g., [8,33]). A few works studied supporting social connections between adult family members over distance (e.g., [7,21,84]). For distributed family

members, social technologies (e.g., email, text messaging) allow them to maintain close relationships, sharing affection and support when needed [30,62]. Similarly, existing technologies (e.g., email, messaging, social media) help adults continue their relationships with friends over distance [13,26,71]. For adult friendships, technology-mediated communications often supplement in-person connections because they provide convenient channels for friends to stay connected [26,40,77] and facilitate in-person meetings [13,72]. For adults who are disabled and homebound, technologies help them stay connected with friends and reduce their feelings of isolation [58,71].

Researchers have also designed and built new systems to better support adults' social connectedness: awareness-based systems to connect distributed family members [67,96] and emerging videochat systems that support adults' friendships [9,50]. Shared activities are one of the social practices that researchers are designing new systems to support. Both Gorsic et al. and Seaborn et al. built competitive and cooperative social games to help adults maintain friendships via shared gaming sessions [39,79]. Bentley et al. built a family stories system, allowing family members to share stories tied to geographic locations, which facilitates family members' interactions at a distance and strengthens bonds among family members [12]. When it comes to helping adults connect with the younger generation, shared activities (e.g., gaming, storytelling) are often more effective than traditional technologies like videochat because they provide shared context and structure for remote communications [32,73]. Our work focuses on the social role of tabletop gaming – one of the shared activities – in remote communications among distributed friends and families. We draw findings from people's current practices with remote tabletop gaming to inform future technology designs that will support adults' social connectedness with family and friends.

## **2.2 Games for Social Connectedness**

Prior work in the HCI community has investigated how current gaming practices affect people's social connectedness. Different genres of digital games have been studied in the context of both online and in-person play, including massive multiplayer online role-playing games (MMORPGs, e.g., [24,29,83]), multiplayer online battle arena games (MOBAs, e.g., [56,63,88]), first-person shooting games (FPS, e.g., [48,18]) and real-time strategy games (RTSs, [36]). Studies found that the gameplay through MMORPGs fosters connections among players by creating a sense of belonging to a team and a community [61,45,46,66]. Meng et al. found that playing MOBAs increased players' social capital when they played with friends offline and with strangers online [65]. Researchers have also investigated how gaming may facilitate vulnerable populations' connections with others (e.g., older adults [69,81,95], children [35,41], people with disabilities [61]). Osmanovic and Pecchioni's study on social gaming in the family context found that games provide common ground for older family members to connect with younger family members, and thereby help increase positive connections between generations [69].

While the majority of the prior works emphasizes digital games, a few studies have also investigated game and social experiences around traditional tabletop games. Tabletop games play an important role in people's offline social practice [82]. Rogerson et al. found that among other factors such as game variety and materiality, sociality also had an impact on the enjoyment of boardgames. Because of the physical nature of tabletop games, recent research on this practice has emphasized the materiality of tabletop game experience [76,97]. Based on the materials experience framework from Giaccardi and Karana [37], Maurer and Fuchsberger examined the in-person tabletop game experience and proposed three design opportunities for remote tabletop game experience, leveraging technologies like smart objects to create remote tangible play experience [64]. Our work also focuses on how in-person tabletop game experience has changed when moving to remote and distributed settings. However, unlike Maurer and Fuchsberger's study, our work emphasizes the social aspect of tabletop gaming and draws findings from people's actual practices in adapting to remote gaming.

### 2.3 Collaborative Technologies to Support Shared-Task Space

Buxton defined two distinct dimensions in technology-facilitated remote collaboration: shared personal space, a collective understanding of copresence among participants and shared task space where the copresence of the task happens [17]. Researchers have investigated videochat-based systems like media spaces to support collaboration between distributed participants in various contexts (e.g., [4,11,5]). Tang and Minneman built a collaborative whiteboard to study shared specialized surface for tasking [85]. For sharing general surfaces, Junuzovic et al. investigated the use of a camera-projector system in collaborative tasks [51]. Recent work has studied AR/VR technologies and head-mounted displays (HMDs) for the purpose of facilitating collaboration over distance, since the traditional videochat technologies often lack the 3D space information during task sharing [49,20,54]. Ladwig et al. studied how VR technologies could create a better-shared task space among collaborators, with a focus on different designs for references and cues in collaborative spatial tasks [57].

Besides supporting collaboration in contexts such as the office [47,59], task completion [55,2], and learning [43,90], a few studies investigated the collaborative technologies in the social context (e.g., [22,23,93]). Yarosh et al. built the ShareTable system which allows videochat and sharing of a tabletop task space, and studied its use in collaborative play between parents and children in divorced households [94]. Odenwald et al. designed the Tabletop Teleporter system, which combines interactive tabletop surface and camera-projector system, to facilitate remote boardgaming in the context of leisure activities [68]. Through an in-lab experiment study, they found that Tabletop Teleporter could better simulate face-to-face boardgame experience compared to traditional videochat-facilitated sessions. Our work emphasizes the context of tabletop gaming and uses such context to understand how people appropriate technologies to create a shared task space (i.e., the tabletop game space in this context). Our findings will shed light on design opportunities for collaborative technology in broader social settings.

## 3 BACKGROUND AND CONTEXT

The emergence and rapid spread of COVID-19, caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), has led to an ongoing global pandemic. The outbreak was first identified in December 2019 in Wuhan, China, and the first case outside of China was reported on January 13th [3]. In the next month, cases began to rise in countries such as the U.S., Nepal, France, Australia, India, and many more.

To prevent the further spread of the COVID-19 virus, countries worldwide imposed social distancing rules. The U.S. confirmed its first COVID-19 case on January 21st, and the number of confirmed cases quickly rose to 24,583 in merely two months [19]. On March 18th, California issued the first state-wide stay-at-home order in the U.S., followed by Illinois, New York, and many other states. Eventually, all 50 states imposed various restrictions to limit social gatherings [98]. Illinois' Governor JB Pritzker announced a statewide stay-at-home order on March 21st, allowing only essential activities, government functions, and businesses to remain open [99]. Although states began to slowly reopen in May (with some states reopening as early as the end of April) [100], social gatherings and entertainment are still restricted as of the time this paper is finalized (in January 2021): for example, the state of Minnesota limits the size of indoor gatherings to 10 people during its reopening plan (phase 1 to 3) [101]. During the first two to three months of aggressive containment measures, all social occasions were cancelled and people had to limit their social activities within their nuclear families or find new ways to socialize in order to adapt to social distancing rules.

## 4 METHODS

We used a multi-method approach to understand technology-mediated tabletop gaming during the social distancing measures imposed by the COVID-19 pandemic. Through participatory observation of online forums, we investigated how individuals in the tabletop gaming community discussed and negotiated the challenges of enabling technology-mediated tabletop gaming. Through in-depth interviews with tabletop gamers, we investigated people’s practices, motivations, and challenges in playing remotely. In this section, we describe both methods and describe our data analysis process to synergistically combine insights from both methods to gain a rich understanding of the lived experiences of tabletop gamers during the COVID-19 pandemic.

### 4.1 Participant Observation

To understand how people played tabletop games remotely during the quarantine, the first two authors of this work conducted online participant observation to learn how people appropriate technologies and adapt their practice to play tabletop games remotely (RQ1), as well as challenges they encountered during their remote play (RQ2). The participant observation also helped us shape our questions for semi-structured interviews. The observation was conducted between mid-March 2020, when the state governors in the U.S. started ordering residents to stay at home [98], and the end of June 2020, when states in the U.S. started entering various phases of re-opening (although in-person social gatherings were still not encouraged) [100].

We chose *Reddit* as our primary observation site and focused on four main tabletop-game-related subreddits: two communities focused on general discussion about tabletop gaming (r/tabletop and r/boardgames), and two communities emphasized discussing playing digital tabletop games (r/digitaltabletops and r/playboardgames). We selected *Reddit* as our primary observation site rather than gaming specific discussion forums since we wanted to observe a wide range of players with different gaming experience, e.g., from casual players who play with family members during social gatherings to game enthusiasts who attend regular boardgame meetups. We also used *Twitter* and *Instagram* as our secondary observation sites, where we followed tweets and posts about playing tabletop games during quarantine with relevant hashtags (e.g., #tabletopgames, #boardgames, #socialdistancing, #quarantine, etc.). We checked new discussion threads on these social media platforms on a weekly basis and chose to read threads that were relevant to our research questions based on their titles (on *Reddit*) or by glancing at the text and picture (on *Twitter*). For example, a post with the title including “*games to play during quarantine*” might be relevant to our work but a post promoting a new game might not. We did not directly participate in the discussions online and mostly observed, but the two authors also attempted to play tabletop games remotely with friends during the quarantine time to better understand the context.

Field notes were kept on a weekly basis as the observation was conducted. In the field notes, we recorded screenshots of the posted pictures or the relevant discussion, direct links to the original posts, direct quotes of relevant posts, as well as researchers’ thoughts and memos from observation. We later incorporated our field notes into the analysis process.

### 4.2 Scraped Posts and Comments

To supplement our observation notes and analyze discussion threads more systematically, we scraped posts and comments from the four subreddits (r/tabletop, r/boardgames, r/digitaltabletops, r/playboardgames) where the observation was conducted. We used pushshift.io API [26] to collect all posts between March 15th and June 30th, 2020 and PRAW API [27] to retrieve the associated top-level comments from these subreddits. We then used keywords focused on discussing remote tabletop gaming during quarantine time (e.g., social distancing, social isolation, quarantine, lockdown) to check relevancy for the posts and comments scraped. We also excluded posts that have been removed or

deleted by the moderators. Our final set of data that we incorporated into the analysis process included 285 posts and 3572 associated top-level comments.

### 4.3 Semi-structured Interviews

We used in depth, semi-structured interviews to better understand considerations behind people’s technology appropriation, practice adaptation (RQ1) and factors that affect their game and social experiences during remote tabletop gaming (RQ2). We recruited participants online through *Reddit*, *Twitter*, and local *Facebook* groups (tabletop games related) by posting study information and the link to the screening questionnaire. The screening questionnaire included questions about the frequency of their tabletop gaming during the quarantine, people they played with, hardware and software they utilized for setting up the game session, as well as their contact information. To qualify for our interview study, the potential participant must have played tabletop games at least once a month during the quarantine and played with friends who they met in real life and/or family members. Our screening questionnaire received a total of 52 responses and two responses were excluded from our potential participant pool. We then followed up with the qualified responses to see if they were interested and available for the interview study. We stopped recruiting new participants when in-progress analysis suggested that we had reached data saturation, as we heard the same themes repeat and no significant new themes emerge during the interviews. All interviews were conducted during June and July 2020.

A total of 15 participants were recruited for semi-structured interviews (see Table 1 for their demographic details). The majority of the participants were based in the Midwestern area of the U.S. The interviews were conducted by the first author remotely using videochat (*Zoom*). Each interview lasted 45-60 minutes, including questions about tabletop gaming experience before the quarantine time, tabletop gaming experience during the quarantine, and social experience through tabletop gaming during the quarantine. All interviews were recorded and transcribed by the first two authors for analysis.

Table 1: Participant information for the interviews, including gender (participants self-identified), age, location, highest degree obtained, occupation, and group of people they play with.

Participant	Age	Gender	Location	Degree	Occupation	Playmates
P1	24	M	AZ, U.S.	Bachelor	Electrical Engineer	Family, Friends, Strangers
P2	34	M	India	Master	Project Manager	Family, Friends, Colleagues, Strangers
P3	34	F	MN, U.S.	Bachelor	Administrative Assistant	Family, Friends
P4	41	F	MN, U.S.	Bachelor	Unemployed	Family, Friends, Strangers
P5	38	F	MN, U.S.	Bachelor	Lab Manager	Family, Friends, Colleagues, Strangers
P6	46	M	IL, U.S.	PhD	Professor	Friends
P7	27	M	IL, U.S.	Master	Student	Family, Friends
P8	35	F	MN, U.S.	Master	Teacher	Family, Friends, Colleagues, Strangers
P9	52	F	MN, U.S.	Master	Faculty	Family, Friends
P10	35	M	IL, U.S.	PhD	Data Scientist	Friends
P11	26	F	IL, U.S.	Master	Church Minister	Family, Friends
P12	27	M	CA, U.S.	Bachelor	Student	Friends
P13	27	M	MN, U.S.	Bachelor	Teacher	Family, Friends, Colleagues
P14	29	M	MN, U.S.	Bachelor	Sales Representative	Family, Friends, Strangers
P15	39	M	CA, U.S.	Bachelor	Game Designer	Family, Friends

### 4.4 Analysis

We combined collected data from different sources to answer our research questions: field notes and scraped posts from communities’ discussions helped us learn different technology setups that people used to adapt to remote play, while

in-depth interviews allowed us to understand considerations behind people’s technology appropriation, challenges they encountered with remote tabletop gaming, and their game and social experiences when playing remotely. To analyze all the data from different sources, we adopted a qualitative, data-driven approach, following the guidance of the reflexive approach in thematic analysis [14]. All data collected were converted to textual format (observation notes, scraped posts and comments, interview transcripts) and open-coded by the first three authors. Each author led the coding process for one third of the data. Over 1000 open codes were generated from the coding process. The first three authors then met remotely and worked together to organize codes into groups and discussed the relationship between codes to identify categories from the groups. Five additional memos were generated to chronically document early emerging themes and ideas. We identified three main themes from our analysis which are described in the Findings section.

## 5 FINDINGS

We identified three themes that describe people’s social and game experiences from in-person to remote setup: creating a shared tabletop environment (*shared space*), enabling a collective understanding through communication (*shared information and awareness*), and facilitating a communal temporal experience (*shared time*). For each area, we present a rich description of how people appropriate technologies to accommodate changes when moving to remote contexts and what challenges remain in supporting remote game and social experiences.

### 5.1 Shared Space: Creating a Shared Tabletop Environment

In the offline context, tabletop space plays an essential role in the game and social experiences as people gather around and interact with such shared game space. When moving to remote tabletop gaming, we found people attempting to preserve the physical setup of the tabletop space with a hybrid (digital and physical) setup or adapt their practice to a virtual shared space. We then discuss challenges with these two setups, including missing the physicality with traditional tabletop experience, asymmetric access to the shared tabletop space between players, and missing social stimulus in offline game experience.

#### 5.1.1 Preserving Physicality of Tabletop Game Experience with Hybrid Setup

A hybrid setup combines the physical components of the tabletop games (e.g., dice, chips, boards) and digital platforms (camera and videochat to capture and share the physical components). Players chose a hybrid setup for many reasons. Since it is fairly easy for players of tabletop games to access their own physical copies of the games, it was convenient for them to set up the shared game space with existing physical games. P11 said that she and her friends set up a remote *Scramble* game session with the physical game, phone camera, and tripod because they wanted to use the physical game they just purchased before the COVID-19 pandemic. When playing a legacy game (i.e., the game itself is designed to change permanently through game sessions) with multiple sessions, P7 explained that remote game sessions with existing physical board allowed he and his friends to continue and complete the game they started before the quarantine, without spending extra time transferring the board state to another platform or starting the whole game from the beginning. P14 talked about using a physical dice when playing *Dungeons and Dragons (D&D)* remotely to preserve the experience of rolling the physical dice.

From online observation and in-depth interviews, we found a diverse range of physical components utilized by the hybrid setup. External cameras (e.g., phone camera, webcam, document camera) were often used to facilitate the sharing of the physical tabletop game components, from rolling the physical dice to manipulating the entire physical game board. Extra stand (e.g., tripod, home-made stand) to mount the camera were often needed when sharing an entire board, with

the occasional need for players to take the camera out from the mounts to manually zoom into areas of the board for more details (Figure 1(a) shows an example with such setup). We found four categories of hybrid setups for the tabletop game space from online observation and interviews:

- **Gamemaster (GM) does-it-all:** one player sets up a physical board to be shared with other players. The player with the physical board is often in charge of manipulating physical components on the board based on other players' actions. For example, to play the game *Pandemic*, P7 set up the shared tabletop game space with a phone camera mounted on a stand and pointed at the physical game board, which was shared with other players through videochat. Figure 1(a) demonstrates an example of such a setup using a smartphone camera put on a stand to capture the physical game board. Figure 1(b) shows how the screen view might look like from the player's side.
- **Mirrored boards:** each player has their own physical board shared, and they often manipulate their board based on other players' actions with their boards. People used this setup when playing games with less complicated physical boards and components. P15's son uses the mirrored setup to play chess with his friend. Both children set the chess board up in their own room, and they each used a tablet to communicate via videochat. Other tabletop games with a relatively simple physical board such as *Zombicide Invader* could be played this way, and Figure 1(c) shows an example game session with Mirrored boards setup.
- **Face-camera only:** when the game does not require a board, players can simply share physical components (e.g., cards) through face cameras they use for videochat. P4 mentioned using such a setup with her friend to play *Codenames* remotely. They each had a deck of cards by their side and they independently drew the card from their side and show it to the other player through face cameras.
- **Pen-and-paper:** each player using their own physical dice, as well as pen and paper for the game. Tabletop role-playing games (TRPGs) and games that do not require shared physical components often use this setup. Figure 1(d) provides an example setup for a remote *Scattergories* session, which can be played only with a vocabulary sheet and a dice over videochat.

Unlike in an offline context where all the players had similar access to the tabletop game space, in the hybrid tabletop setup, some players could not directly interact with the shared tabletop game space. For participants who utilized the hybrid tabletop setup, one player from the group usually plays the role as a gamemaster (GM), who was in charge of setting up the physical game board with other components and manipulating the physical board as the game progresses. Other players often interacted with the shared tabletop space via verbal communication, for example, to move the physical game pieces, draw cards, or take a closer look at the game board. The different accesses players had to the shared tabletop space might bring challenges to the game experience. During a remote *Scrabble* session, because of the indirect access players had to the shared board, P11 misread letters from certain tiles and only noticed when all players started calculating points.

Since all other players had to access the board through the GM when a physical tabletop space was shared, tasks like moderating the session and memorizing different players' states became more of the GM's sole responsibility rather than shared responsibilities among players. As P7 commented, "*people who are in charge of the physical setup become central to the game*". This sometimes became burdensome for the GM and affected their experience in the game session. P12 mentioned that although he asked other players to share some of the responsibilities, he still ended up doing all those tasks, as he was the only person with direct access to the physical game board. And as the session progressed, these responsibilities made his remote game experience feel like work:



“Usually I’m setting up and running everything on my own. It’s sort of tiring on my part.... because I’m usually the dungeon master for D&D, but with the cognitive load of keeping track of all the initiatives and recording all the monster stuff, there’s just so much of being a human computer.” (P12)

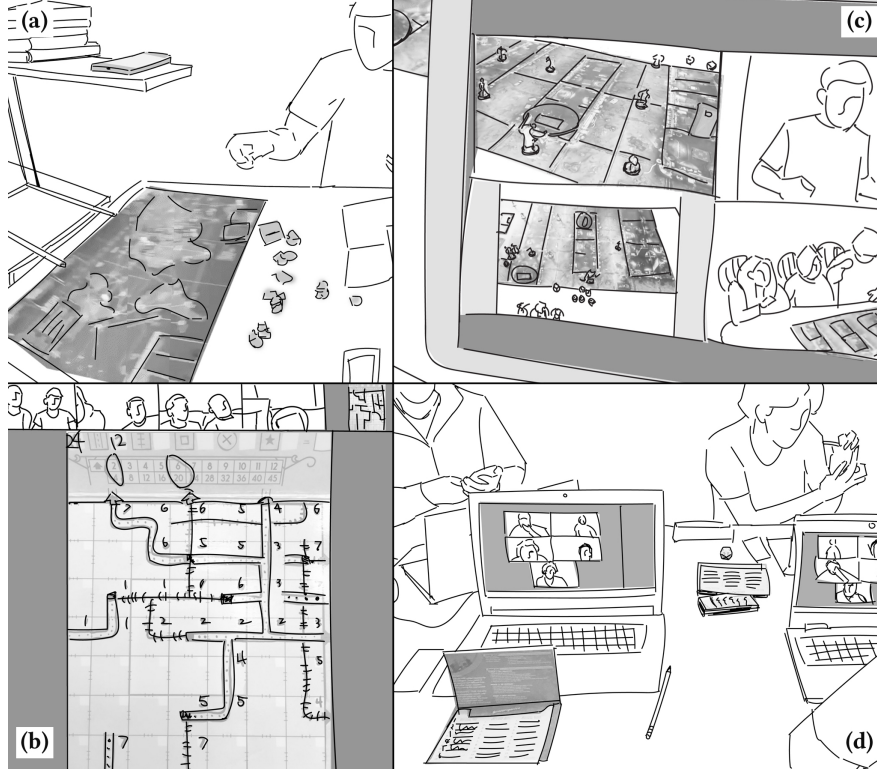


Figure 1. Traced pictures of examples for Hybrid Setups retrieved from online observation: (a) Gamemaster does-it-all (board view); (b) Gamemaster does-it-all (videochat view); (c) mirrored board (videochat view); (d) pen-and-paper.

### 5.1.2 Replacing Physical Space with Virtual Space

Alternatively, people utilize existing online platforms to setup their shared virtual game space for playing tabletop games remotely. There are three main categories of digital platforms that are used for remote tabletop gaming:

- **General tabletop game or boardgame platforms** that included a variety of games, e.g., *Tabletop Simulator*, *BoardGameArena.com*. This is also the most popular type of virtual platforms people used to setup their virtual tabletop space. We found 47 post threads discussing playing remotely on these platforms, while 9 out of our 15 participants mainly used these platforms for their remote gaming sessions;
- **Specific game applications** that people can often play from their mobile devices such as phones and tablets, e.g., *Catan Universe*, *Scrabble GO*. For example, P1 used the *Catan Universe* app to play *Settlers of Catan* with his mother and sisters remotely;
- **Homebrewed digital gaming space**, e.g., *Google Sheet* to facilitate *Codenames*. P13 provided an example where his friend built a digital version of *Jenga* and used that for their remote game session. We also found 19

discussion threads from *Reddit* elaborating the details of how they bootstrapped a virtual tabletop space to play remotely.

Our interviews revealed that people's preferences often depended on whether a platform has the games that they played in person. Because many gaming platforms required membership subscriptions, participants spent time exploring different options and looked for suggestions online before making a commitment. However, the required cost associated with utilizing the platform may deter people from utilizing them especially when players need to convince other people they play with to adopt such platform for setting up the remote game sessions. As P12 commented, although he learned about using *Tabletop Simulator* for remote gaming, he did not want to make his friends to buy it.

With the virtual space setup, there were often learning curves associated with utilizing online tabletop platforms. In the interviews, P3 talked about spending time getting used to digital controls on *BoardGameArena.com*, as the setup and interface were different from what she was used to in the offline tabletop game experience. However, all nine participants who utilized virtual tabletop space said that it was easier to set up the game board and “*flip the table*” to start a new game with virtual tabletop space compared to starting a new game with the physical game board.

*“Like every time... the first time you play per session, you have to set up the whole board. Every second time you play, you have to flip all the tiles and change all the numbers and... where online, you just press start and it's just all there and ready to go.” (P1)*

Although most people setup their remote tabletop game sessions for synchronous play, being able to play tabletop games on a mobile device provides the flexibility for playing asynchronously for turn-based games where the platforms allow wait times and sessions to last over days. Two of our interview participants (P2 and P5) using virtual tabletop setup talked about playing asynchronously with their friends during the quarantine.

Despite the convenience with online tabletop game platforms, participants acknowledged that the enjoyment with physical tabletop games was gone with virtual tabletop setups. Tangible interactions like rolling the dice, feeling the weight of the chips, and tearing down the cards, contributed to a vital part of the offline tabletop game experience. As P14 commented, “*it's always more fun with your own dice*”. Such tangible interaction and experience with the tabletop game space were often lost when offline tabletop games were translated to online platforms. For example, P3 commented that when she was playing *7 Wonders* on virtual platforms like *BoardGameArena.com*, she “*couldn't feel the weight which was not satisfying*”. We also found posts suggesting people who played on virtual platforms to find other ways to make up for the missing tangible interactions for a pleasant game experience (e.g., adding special rewards to the game). Similarly, P3 talked about her experience with another game using a virtual game space setup, where the game design utilized visuals, sound and animations to amplify the virtual game experience:

*“When you do things in the game [Potion Explosion] virtually, you will have the reaction that happen... like when you choose a potion, there's a really satisfying pop sound... [in 7 Wonders] it's essentially like they took the boardgame and you see the pieces online, but there weren't really any changes made supporting the virtual. So, they're essentially losing the tactile quality and they're not really do anything to add...” (P3)*

## **5.2 Shared Information and Awareness: Enabling a Collective Understanding through Communication**

In the offline context, direct verbal communication and non-verbal social cues often facilitate both the in-game collaboration and non-game social interactions. We found when playing tabletop games remotely, people deliberately setup communication space with the tabletop game space for gaming as well as socializing. We then present challenges with existing technologies for setting up the communication space.

### 5.2.1 Setup Additional Communication Space for Gaming and Socializing

To facilitate communication during the remote game session, people often set up a communication space (e.g., videochat, audio chat, text messages) in addition to the tabletop space. For players, it is important to have such shared communication place to be able to collaborate, exchange game strategies, as well as engage in social conversations during the game sessions. During the interviews, participants discussed how they viewed the tabletop game as an opportunity for structured social activity and the importance of being able to see and chat with friends and family members during the game. Participants often utilized the remote tabletop game sessions to check in upon each other during the pandemic and looked forward to the social conversations sparked by the game. As P2 said about playing tabletop games:

*“I know what happened in Snakes and Ladders... What you don’t know is what will happen in the chat.” (P2)*

When setting up the shared communication space, people often leverage communication platforms they have used in other contexts (e.g., work, school, daily communications). Both P6 and P7 talked about the benefits of using *Zoom* that was associated with their school accounts for remote tabletop gaming, which allowed them to set up longer game sessions (free personal accounts were only allowed to have 45 minutes per meeting session), and to record the remote sessions that later could be shared with other friends who were not able to attend. Participants also discussed how they chose the platforms based on other players’ comfort level with technologies, as they often had several communication tools that they could choose from for setting up the remote play. For example, P4 had utilized both *Google Hangouts* and *Discord* as shared communication space for their remote game sessions but with different groups of people. While *Discord* tend to have better quality in connections, P4 often used *Google Hangouts* when playing with family members or friends who already took a lot of time to learn the remote tabletop game platforms. Finally, people may use different communication platforms to set boundaries and separate virtual work and personal space. One *Reddit* discussion thread talked about the tendency to choose game-specific communication platforms such as *Twitch* or *Discord* instead of professional video-conferencing platforms, since the latter have already been used for work meetings.

We found that people choose various communication media (video, audio, or text) for setting up the shared communication space based on their circumstances. Text messaging was used when participants were playing asynchronously (P2) or played for a shorter game session when there were fewer needs for communication (P8). Participants who utilized videochat during the remote game session emphasized the importance of “*seeing faces*” (P9) during a social game session. Videochat can also provide information beyond verbal conversations when communicating with other players. Camera-captured facial expressions and other visual information became important for tabletop games that relied on interactions between players. For example, P4 talked about playing *Codenames* with another friend remotely with videochat, which worked well as they were able to directly see each other when guessing their words. The Internet connection speed was often the main reason when people decided to switch from videochat to audio-only communication. Audio-only communication provides less information among players and people find it less socializing when there was only audio setup for the shared communication space. However, P6 mentioned a remote TRPG session where the audio-only communication added an extra layer to the game experience compared to videochat. As P6 described, compared to videochat, the audio-only chat actually allowed more space for imagination during the storytelling, and he felt more immersed during the game.

### 5.2.2 Missing Social and Non-verbal Cues during Remote Play

Social and non-verbal cues play an important role in facilitating communication and collaboration in offline tabletop gaming. Eye contact, body gestures, or actions with the tabletop game space help players build a collective understanding

of the game as well as towards each player. Although videochat could provide more information compared to audio or text chat, it still heavily relies on verbal communication and the information shared through videochat is limited to what the camera is able to capture. As P13 commented, the camera setup for the shared communication space was often limited to the players' face and upper body. P14 also mentioned that such limitation made it challenging for him to perform during remote TRPG sessions, as he needed body gestures during the performance to engage other players:

*"But, without eye contact, without anything able to move around or engage beyond just talking... I feel like I'd been kind of put on the shelf for a little bit. And it was super easy to kind of disengage and focus somewhere else while that was happening."* (P14)

P9 also commented that missing eye contact in videochat made her feel socially disconnected, due to the disparity between the camera location and other players' face: *"if you look at her face, they don't think you are making eye contact."*

The social awareness built among players was also missing with the current setup for the shared communication space. The absence of non-verbal social cues might even cause conflicts between players. When one player was taking their turn and thinking through their moves, it was difficult for other players to notice unless verbally prompted. Such understanding was often communicated when players see others fidgeting physical tokens or switching cards held, and it was important for people to feel the game was engaging every player. P13 discussed how the silence from people who were idle and not able to see other players' physical actions made people more conscious about taking time to think when playing remotely. P15 also shared a remote tabletop game session his son had with another friend. During the game session, his son sometimes moved out of the range that could be captured by the camera, which frustrated the other player as they could not tell if his son was still engaging in the game.

### **5.3 Shared Time: Facilitating a Communal Temporal Experience**

Like shared tabletop space and communication space, time also plays an important role in tabletop game sessions. When the tabletop game session moves online, the structure of time in these remote game sessions changes – game sessions have become easier to schedule online versus in-person, but these sessions tend to be shorter. Players' perception of time also changes because of changes in their attention and fatigue with screens during remote play, which made people adjust the game session length to account for these changes. However, the quality of the shared time often depends on the technologies used for the game session, and people's feeling of social connectedness is often affected by technical issues that happen during remote gaming.

#### *5.3.1 Changed Structure of Time to Provide Opportunities for Casual Play*

Before the pandemic, the schedule of an individual with a full-time job was fairly structured: leisure time, such as boardgame sessions, usually happen after work or on weekends. But since the pandemic, the structure of time has become more fragmented as more people begin to work and study from home. Meanwhile, as schools move online, parents end up with more childcare obligations and even more fragmented time as they juggle between work, childcare, and other obligations. Remote tabletop gaming provides a good opportunity for casual games during these fragmented leisure time. Participants felt that it was easier to organize and schedule remote tabletop gaming sessions compared to scheduling their previous offline sessions. Since people can access their laptops and phones easily without the need to leave their houses, finding a time for everyone to play together becomes easier. Participants also reported having more shorter game sessions with smaller groups of people during the quarantine time compared to the game nights before the pandemic, as a result of the changed structure of time. P8 talked about being able to have a relaxing 15-minute remote tabletop gaming session with her friend at the end of a workday, because the game is easy to access and to set up.

One of the challenges with playing tabletop games during the offline game nights is no-shows, since people often have to adjust the game they want to play, as the variety of games is limited by the size of the group present. During the interviews, our participants discussed that such a challenge was easier to resolve when playing online, which also provided the opportunity to blend different circles that they played tabletop games with. P1 said he would often ask his friends if they want to join the game session with his family members if they need more people. P10 also talked about extending the remote gaming circle by inviting other groups of friends. When receiving the invites, people often responded and joined the game sessions quickly, because of the convenience of setting up and joining a remote game session.

Unlike offline tabletop game sessions, which are confined to a certain space and time, remote tabletop game sessions could happen at various spatial and temporal zones. While synchronous sessions could bring people to play during a dedicated time, asynchronous play offers an alternative to mitigate scheduling challenges between people. P2 mentioned that during the pandemic, he was able to play tabletop games with his cousins from different time zones, under the format of asynchronous play, as a way to maintain connections during the quarantine. However, these asynchronous game sessions often last for 3-5 days, and participants felt other players were less responsive compared to synchronous play. Furthermore, the asynchronous game session often ends when a player has not responded for a long time, and other players need to start a new session to get the game going. As P2 compared the synchronous sessions to the asynchronous ones he had played, he had a stronger sense of “*being together*” during the synchronous game sessions as he knew other players were there and will respond to his moves, which was not the case for asynchronous game sessions.

### 5.3.2 *Changed Perception of Time due to Changes in Attention and Engagement*

When playing tabletop games remotely, people tend to have shorter game sessions compared to the offline game sessions they are used to before the quarantine. With the virtual tabletop game space setup, our participants found it more difficult to engage and focus compared to offline setup. P14 talked about the difficulties with remote gaming:

*“But... in a large group, you kind of lose your engagement because you don't have anything for your attention to grab onto... It's like being in a work meeting where everybody's kind of talking back and forth.” (P14)*

In spite of hybrid tabletop space setup attempts to preserve physical components from the offline experience, it required more effort to manipulate and share the physical board, which affected the energy people had for the game. One difference between online and offline tabletop gaming, which P15 mentioned during the interview was that, when playing in-person, they often wanted to play another game at the end of one round. But such feeling of “*wanting to play more*” was gone during the remote game session, because of the exhaustion and fatigue with screens. P15 suggested modifying game rules to shorten the game length when playing remotely, which could help prevent the fatigue from remote gaming and keep people interested. Posts from the *Reddit* community that offer suggestions for remote tabletop gaming also talked about “*simplifying rules*” or “*make it easier to win*” to keep the game engaging given the exhaustion that people might have from spending extra time to set up the game sessions.

During the interviews, some participants discussed how their perception of idle time and patience changed from offline to online tabletop gaming. P13 discussed that when playing turn-based game remotely, people tended to be more conscious about the time they took during their turn. P5 and P13 both talked about their impatience while waiting for other people's turns during remote tabletop game sessions, which was different from their offline game experience. Such impatience during idle time could come from the lack of non-verbal information and awareness of other players through shared communication space. This change in people's perception about idle time and patience could affect people's game and social experiences, as P5 commented that “*the session got boring when she felt the turn was taking too long*”.

### 5.3.3 Quality of Shared Time affected by Technical Issues

Technological constraints (e.g., device performance, internet speed, stability of connection) directly affect people's game and social experiences when playing tabletop games remotely. The quality of the time shared between players depended on the amount of energy people spent on resolving technical issues they encountered during a remote game session. When asked to provide a remote game session they enjoyed, both P5 and P8 shared a session that was going smoothly because no one had connection or internet glitches. And because everything was going smoothly, P5 felt *"it is just like a normal game session they would have before the quarantine"*, which made her feel more connected. P10 had similar sentiment that *"all the technical glitches felt like reminders that they could not play together in person"*. The time spent on troubleshooting technical issues occupied people's time and energy for gaming and socializing. Failing to resolve the technical issues and set up the technology platforms needed could lead to losing such opportunity for playing together. P3 shared a situation where they spent too much time and energy helping one of their friends with setting up the technology for online gaming platforms, but still were not able to make the technology work. They ended up just chatting over videochat for the rest of the scheduled gaming session.

## 6 DISCUSSION

We begin this section by reflecting on how people adapt their game practices for a better social outcome when playing tabletop games with families and friends. We describe design opportunities for technologies to better support social connections through remote collaborative play. We then discuss how our findings reflect on measuring social connectedness in shared activities such as remote play. We conclude with limitations and future research revealed by our study.

### 6.1 Curating Games and Manipulating Game Rules for a Better Social Experience

Prior work shows that players of boardgames often use material elements of the game to collaborate and improve their awareness of the game's state, which enable them to better compete against each other [75]. We found that people often prefer cooperative games over competitive games when playing with friends or family in their general tabletop gaming practice. P15 emphasized that playing tabletop games is *"more about having fun rather than winning."* Even when playing competitive games, people would come up with cooperative strategies for a better social experience. For example, P11's husband is particularly good at boardgames, so she and her friends often team up to play against her husband, emphasizing the collaborative nature in competitive games. Given the changes in people's tabletop gaming practices from offline to online, people also adapt game rules to obtain a better social experience during the game. P15 thought remote tabletop game sessions should be shorter compared to offline sessions to keep all the players engaged. Similarly, a *Reddit* community member suggested easing off the game difficulty or allowing cheats to manage the frustration with the remote gaming setup. P9 also discussed how certain unintended mechanisms in the game she played with her family helped to balance the competitiveness between players by periodically reset the player's score back to zero once a browser advertisement pops out. These findings highlight players' practice in curating games and manipulating game rules for a better social experience when playing with family and friends. These finding also highlight the importance of digital gaming tools and publishers that allow flexible rules, scoring, and alternative teaming strategies (see section 6.2.3) – aspects that are frequently unavailable in current digital-only platforms.

## 6.2 Design Implications for Technology to Support Social Connectedness through Remote Play

Most participants in our study emphasized that the ultimate goal of remote gaming was to foster social connectedness and reduce isolation, particularly during the social distancing of the COVID-19 epidemic. In this section, we provide three broad design implications to support social connectedness through remote play.

### 6.2.1 *Augmenting and Connecting Shared Tabletop Space*

In previous work studying players' experience when playing boardgames, Rogerson et al. found that materiality, or physicality, constitutes a large part of people's enjoyment through gaming [76]. Our study empirically demonstrates the importance of that materiality given the relative prevalence of hybrid approaches to digital-only approaches to online gaming. Our findings reflect the vital role that physicality played in people's tabletop game experience and indicate that people often tried to preserve physicality with their remote tabletop space setup. Not only do people enjoy the tactile feeling of interacting with physical components, these physical components also help engage people during the game session, as P14 talked about in the interview. The level of physicality in the shared tabletop setup can vary, although details as small as incorporating physical dice in remote play counts for a better social experience. However, unlike in offline game sessions, where such physicality is often shared among players (e.g., accessing the same physical board or the same dice), the tangible experience in remote play is quite separate from each other. Future technology design should consider augmenting the shared tabletop space with connected tangible components for a better social and game experience. Villar et al. designed and built a tangible interaction platform that could sense and communicate with the physical objects placed on the platform, which allows convenient communication between the tangible surface and the virtual space [91]. Design for supporting hybrid shared tabletop space could extend such setup to connect different physical boards between players for a better game experience. Technology design could also support the connections among physical components in the hybrid setup, such as an augmented physical dice that changes the color of its embedded LED light for different players' turns [16]. These augmented tangible objects offer better support in communicating information between players and facilitate the game session to create a connected tangible experience.

### 6.2.2 *Supporting Awareness among Players*

When playing tabletop games, verbal and non-verbal signals expressed through face, body, motion, and voice as well as other social interactions are important communicative tools to convey social and contextual information [1,102]. Social cues such as eye gaze, facial expression, vocal tone, and body language are crucial to facilitate better social understanding. However, these social cues are often missing in remote tabletop game sessions. The disparity between the location of the camera and people's appearance in videochat could lead to the feeling of disconnectedness (P9). And the lack of environmental perception and player awareness could cause frustration and conflict among the players (P15). Hence there are opportunities for technology to provide more information about players to facilitate communication and awareness during the remote tabletop gaming, to create a more socially connected experience. Research in the broader context of collaborative technology also highlighted the importance of communicating social cues in facilitating and coordinating collaborations. Prior work in the CSCW community highlight the importance of communicating social cues such as gaze [78]. Although communicative social cues like eye gaze often require HMDs, designers could also consider using the head/face directions captured by the camera to predict eye gaze in their system designs. How to communicate such connected social cues is also important, as researchers found that different visualizations of eye gaze information affect task collaboration [28]. Designers should be aware of such affect when designing the visualization of social cues for better communication during remote gaming. Furthermore, communicating information about players

could also help build awareness and empathy among players. A system using a camera to sense and communicate heart rate among co-located players [34] could be leveraged to a remote tabletop gaming setup to help build awareness and empathy during remote tabletop gaming.

### 6.2.3 Allowing Customization for a Better Social Experience

Current virtual platforms and tools mainly focus on enforcing the existing game mechanism, such as rule enforcement. *Boardgamearena.com* user P3 mentioned that, when two players from the same IP address enter the game, a warning message “*this player plays from the same IP address as another player*” will appear on the screen. The website clarifies that, when some players play from the same IP, “*you should be vigilant and check that they are not collaborating during the game.*” While the platform uses IP address analysis to prevent fraud or foul play, many remote gaming sessions among friends or family members involve two or more co-located players. Such platform design seems to prioritize game rules and fair play over social play. Meanwhile, social players tend to prioritize the fun in games and the overall social experience over enforcing game rules, to the point that they would even change game rules on the spot for a better in-game social experience (section 6.1). Thus, designs for shared game space should allow players to customize gameplay for better social experiences. Related works on customization often discuss such requirement in the context of gameplay, such as customizing avatars, game design or game rules [6,27]. Customizing games helps tailor the game experience to people’s needs and preferences, while in the social settings, customizations of the game design, content, or rules should be mapped onto the social experience and outcome during the remote play. For example, the ability to customize the reward mechanism or difficulty level could improve the social experience from a game session between novice players and experienced players. Customization could also be made based on different social context for remote tabletop game sessions, as the social needs of playing with friends might be different from the social needs of playing with members of extended family.

## 6.3 Measuring Social Connectedness during Remote Activities

Our study provides an initial investigation of social connectedness through gaming, focusing on descriptions of participant experiences. However, future work in this space may benefit from explicit operationalization of social connectedness, supporting a more quantitative approach in measuring the effects of remote gameplay. Social connectedness, as a subjective perception of experience, is often measured with self-reported scales in quantitative studies. Researchers utilize many diverse operationalizations that are utilized to measure social connectedness on the level of individuals, including relationship salience [10], relationship satisfaction [38], feeling of closeness [10], loneliness [26], and quality of life [87]. The objective aspects of social connectedness are often measured on a macro level, primarily relevant to the network structure of a community [103]. These measurements include total network size, frequency of contact with network members, proximity of the network, among others [25,70,104]. When studying the impact of technology on social connectedness on the micro or individual level, researchers often combine subjective measurements of social experience and objective measurements of interactions. For example, when investigating players’ social connections during different system-facilitated remote gaming session, Odenwald et al. measured the conversation and eye contact exchanges as well as empathy, negative feelings, and involvement between players [68]. As van Bel et al. discussed in their work, social connectedness often originates from both mediated and unmediated interactions as well as the awareness of mediated information. Based on the participant experiences described in our work, we are able to recommend specific variables that may be most salient in this context. In this context of remote communication facilitated by shared activity space, unmediated interactions (e.g., direct conversation, eye contact), mediated interactions



(e.g., interactions through virtual avatars in a remote game session), and awareness of mediated information (e.g., empathy among people) are all important dimensions to measure when understanding people's social experience through technology facilitated remote activities. Based on our study, we encourage researchers to incorporate all three dimensions in their future work on connectedness through gaming.

#### 6.4 Limitations and Future Work

Our findings are affected by the demographics of online communities we observed and of our interview participants in the specific context of remote tabletop gaming during the COVID-19 pandemic. Almost all of our interview participants (14 out of 15) were from the U.S. with the majority residing in the cities of Midwestern areas. None of our participants were over 55 years old. People in other areas of the U.S. or outside the U.S. might be affected by the pandemic differently and hence may have different practice about tabletop gaming and socializing under social distancing restrictions. Our study approach was also affected by the COVID-19 pandemic and we limited our methods to remote technology mediated options to investigate our research questions retrospectively. Methods like contextual inquiry would allow direct observation of the remote gaming setup or even a remote tabletop gaming session to understand people's technology appropriation and game practice *in situ*.

We also identify future directions for research investigating the technology setup for shared tabletop space in social settings. Our study found a hybrid setup for shared tabletop space is often more accessible to people and allows for better social experience compared to virtual tabletop gaming setups. However, our study did not address whether the potential differences in gameplay may affect players' social interactions and experience, but it points towards a direction for future investigations. Our study also did not directly compare the game and social experiences between hybrid and physical setup, which future studies could address.

### 7 CONCLUSION

This paper presented a multi-method study of people's remote tabletop game sessions, particularly their social experience, during the 2020 COVID-19 pandemic. The scope of our study is limited to tabletop games, and our findings highlight the social impact of tabletop games. Through an empirical study on how people appropriate existing technologies to support their social needs in the absence of in-person meetings, we identified three themes that describe their game and social experiences during remote tabletop game sessions. Based on that, we propose three areas of opportunities for future technological innovations that will better support remote tabletop gaming and offer a more connected social experience. Our work reveals the social potential of technology-facilitated remote tabletop game experience and highlights improvement opportunities that we hope will foster a better social experience in the age of remote collaboration.

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