The SMeFT Decks: A Card-Based Ideation Tool for Designing Hybrid Digital Boardgames for Distanced Play

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Increasing numbers of people have turned to playing boardgames with physically distant friends and family via technological tools, particularly since the start of the COVID-19 pandemic. However, commercial hybrid digital boardgames (HDBs) are designed for co-located, rather than distanced, play and there is a need for more specific tools to support hybrid game design. This paper introduces the SMeFT Decks, a set of card decks to aid in the design of HDBs for distanced play, which support Story, Mechanism, Function and Technology. We describe the use of these cards for design ideation and demonstrate four game concepts for distanced play stemming from the use of these decks in participatory workshops. We report evaluative feedback from a pilot study and from 46 participants who used these cards across nine design workshops and reflect on what we learned from observing this process. Results suggest that the SMeFT Decks are a productive ideation tool for aiding in the design of HDBs for distanced play in collaborative workshop settings.

1 INTRODUCTION

Games are an important way for friends and families to connect despite being physically apart. Both hobbyists and more casual players have taken to 'homebrewing' physical boardgames, particularly during the COVID-19 pandemic, to work for distanced play. They utilize technological supports such as video conferencing software as well as playing fully digitized boardgames [10]. However, mediating boardgame play through technology can be difficult. Many of the qualities that people most enjoy about playing boardgames – including a sense of social connection and materiality – can be lost when play moves to digital

devices [5, 24, 30, 38]. There is thus an important space left here for the development of dedicated hybrid digital boardgames (HDBs) (that is, boardgames that combine physical pieces with digital technology) designed specifically for distanced play. Furthermore, given the relative novelty of these kinds of games, the design process requires designers to navigate complex considerations of technologies and their functions [21, 28, 30, 39, 40].

To address this gap, this paper introduces the SMeFT Decks, a set of four card decks, that act as creativity support tools (CSTs) for collaborative design workshops, exploring **S**tory, Game **Me**chanisms, **F**unctions and **T**echnology to support ideation of game designs for distanced play. Use of these cards foregrounds the role of technology and its functions in this novel game design space. Well-designed CSTs have been shown to enhance creativity, enable and foster innovation, and provide "a language that influences … creative thoughts" [15]. Cards have frequently been used as CSTs for game ideation and design [1, 16, 32, 37]. A review of 155 card-based design tools [42] suggests that card-based CSTs help to generate ideas, introduce novel perspectives, maintain focus on the task, stimulate discussion, improve creativity and novelty of final designs, and improve communication within teams. Of particular relevance to this project is the use of cards that "provide concepts for specific design problems or domains" [42].

Commercial CSTs for boardgame design attempt to extend the concept of "piece packs", which provide aspiring game designers with a range of components to use in their designs. For example, the White Box [18] is presented as "a game design workshop … in a box!" and comprises a range of generic boardgame pieces (counters, meeples, cubes, dice and plastic discs) as well as a book of 25 essays on game design. It has been criticised, however, for its focus on marketing and selling a finished game design rather than on supporting the game design process [49]. A different approach is taken by books such as *The Art of Game Design: A Book of Lenses* [44], which provide advice to inspire and support design, albeit at a broad and general level.

A review of CSTs used in HCI highlights that researchers frequently develop custom CSTs to support the particular goals of their project [12]. For example, Values cards were used as part of the Grow-A-Game design activity to encourage designers to systematically consider "the moral, social, and political resonances of design features" in game design [1]. Similarly, Exertion cards guided users in developing Exergames [32], and "Superpower" cards reflected "common human values applicable in enterprise project settings" [37]. Like these tools, the SMeFT Decks draw on deep understanding of a unique design domain to support design—in this case, of hybrid digital boardgames for distanced play.

Despite the widespread use of card-based ideation tools in research and in game design practice, and despite the potential for HDBs to overcome the constraints of physical distance, to our knowledge there are no CSTs supporting the design of HDBs for distanced play. This work thus has three main contributions: Firstly, we provide an original, flexible and ready-to-use card set tool for use in design ideation exercises geared towards developing HDBs for distanced play. We support this with examples and evaluations from the nine design workshops which used the SMeFT Decks. Secondly, we offer a concrete method for using these decks in a workshop setting, together with examples of game concepts that were inspired by the card decks. Finally, we reflect on what we have learned about distanced play from this series of workshops.

We present the SMeFT Decks as an "artefact contribution" in HCI [53] to assist those looking to explore and design for distanced play, including researchers, designers, and educators. Feedback from workshop participants supports the assertion that "good toolkit design can enable or foster innovation in design" [15]; the SMeFT Decks were particularly useful in inspiring design and sparking new ideas. As such, in the spirit of furthering innovation in the much-needed development of HDBs for distanced play, we share this novel card toolkit here.

2 RELATED WORK

In this section, we examine the notion of distanced play, which is fundamental to our creation of the SMeFT Decks and the goals of our ideation workshops. We also describe approaches to understanding game design, as well as the use of Creativity Support Tools in HCI.

2.1 Distanced Play and Hybridity

Despite increasing interest in materially hybrid play [36, 39, 40, 47] and other interactions [6, 46], little attention has to date been paid to what we term distanced play (elsewhere also called dislocated [28] or distributed [30] play). A paper by Maurer and Fuchsberger [28], which identifies design opportunities for remote tangible play, is a notable exception. The authors explore in detail how attention to the lenses of physicality, agency, and time may inform design and discuss the specific design challenges of designing for "shared physicality" with particular attention to the material properties of the game. Similarly, research into hybrid work settings [34] has identified both time and space as critical factors for hybrid collaboration.

Yuan et al [54] explore how players appropriated existing technology for tabletop play in the context of the COVID-19 pandemic. This work identified four approaches to these home-brewed hybrid setups. In a **Gamemaster does it all** setup, a single player has 'control' of the board and other players view it through a digital interface (e.g. a phone camera on a videocall). **Mirrored board** setups see each player having their own physical board and replicating others' actions as they play. Other groups chose to play with **face camera only**, when the game does not require a board, or with **pen and paper** for games where a shared board or visual was unimportant (this was often combined with videochat). A similar approach is taken by Harley et al [17] who present a narrative game for remote storytelling that is played through videoconferencing. Mills et al [30] offer a more technical solution that goes beyond videocalling to explore custom components, developing a modified version of *Letter Jam* for Distributed Play using a combination of individual and group displays, RFID readers and tagged tokens.

Distanced play in these forms is necessarily hybrid. Hybridity here has a particular meaning, referring to material hybridity rather than to hybrid game design methods, for example, or to games that span multiple genres [40]. Although some authors use the language of augmentation to describe hybrid games, this suggests that the game at one point existed in purely physical or digital form and was then modified or added to in order to create the hybrid. Rather, as we outline in [40], we see hybridity as a novel medium that is simultaneously and necessarily both digital and physical and that must be designed as such from the outset. Novel features such as bendable interactive playing cards [22], soundtracks [8] or even heart rate sensors [11] may be implemented within such designs.

Such hybridity creates novel opportunities for design. In earlier work, we [40] explored the 'functions' that hybrid tools offer in gaming and proposed a set of design guidelines [39] for the design of such games. Distanced play, however, requires careful attention to design challenges which go beyond those for co-located play settings. In particular, it is valuable to consider the affordances of distanced hybrid environments. These have previously been studied, for example, in the contexts of hackathons [29] and remote work [31].

2.2 Game Design

Numerous authors have articulated upon the work (or art) of game design more generally to assist designers in turning a game idea into a complete and functional system. These frameworks for design are often based on a certain way of understanding the components or elements that make up games [20, 40, 44, 57]. While there are a number of important texts that discuss game design and its real-world industry practices (see e.g. [2, 14, 43]), we focus on three key models of game design here, as they are important for understanding our

own methods for creating the SMeFT decks to facilitate game design in our own workshops (see Section 3 for more detail).

The MDA framework [20] is one of the more established ways of understanding games and their design. It suggests games have three key design components: Mechanics (the content and rules), Dynamics (the "run-time behaviour of the mechanics acting on player inputs and each others' outputs over time"), and Aesthetics (the emotional responses a player has to the game). Robert Zubek [57], one of the original authors of this work, drew from the MDA framework in his more recent model of game elements, which he argues is less ambiguous and more aligned with industry design terminology. This model similarly proposes three core levels by which to understand games: Mechanics (a game's objects and rules), Gameplay ("the dynamic process of players interacting with the game and each other"), and Player Experience (players' subjective experiences that arise from the gameplay). Other elements not included in the model that nevertheless greatly impact player experience include the story, visuals, sound and music, and more. Some of these are better represented in Jesse Schell's [44] elemental tetrad, which understands games as being composed of four key elements: Mechanics (a game's procedures and rules), Story (the unfolding sequence of events), Aesthetics (how the game appeals to the senses) and Technology (the materials that facilitate a game's functioning).

In all three of these models, the different elements are distinct yet intimately interconnected. Each set of authors argues that designers must be aware of the impact these various elements have on each other and on the functioning of the game as a "complex whole" [14]. While the discussions associated with these models tend to focus on *digital* game design, they are also applicable to *boardgame* design—however, they do not directly address the design of *hybrid* boardgames. Here, Rogerson et al.'s [40] hybrid digital boardgame model is helpful in pinpointing specific considerations for the design of boardgames that make use of both physical and digital components. This model presents eight domains (encompassing 41 functions) that encompass the various ways that hybrid boardgames can make use of digital tools, including teaching, calculating, remembering, storytelling, timing, randomising, housekeeping, and informing. We give an overview of how this model informed the SMeFT deck in Section 3.4.

2.3 Creativity Support Tools in HCI (and in games?)

Well-designed CSTs have been shown to enable and foster innovation, enhance creativity and to "facilitate creative dialogue" among designers and participants [37]. CSTs are often developed and deployed to aid designers, programmers and experts, though CSTs can also be useful for non-experts and other stakeholders [12, 42]. In an overview of the use of CSTs in HCI, Frich et al [12] note a tendency for researchers to develop simple tools for novice users, whereas experts use and develop more complex tools and systems. CSTs can come in many forms in HCI research [12], but of particular relevance for our work are card-based ideation tools. In their review of 155 card-based design tools in HCI, [42] offer a classification of card-based CSTs and highlight the benefits of card-based design tools such as systematic design methods and procedures, creative thinking and problem solving, human-centred design, domain specific methods, team building and collaborative working, and finally, futures thinking. Further articulating the benefits of card-based design tools, [3] observe that "when used in the context of a design process, cards are not prescriptive; rather they act as a support for inspiration, organization and communication of ideas" (p. 214).

As Roy & Warren [42] describe, many card based CSTs offer domain-specific support for ideation and design, such as envisioning cards for value-sensitive design [13] or "magic cards" used by [16] for inspiring magic in product interaction design. Card-based ideation tools have frequently been used to support game design and creativity in HCI [1, 16, 32, 37]. For instance, [25] presents the Verbs, Nouns and Adjective (VNA) cards, which she describes as a "design constraint driven innovation tool" for rapid brainstorming and

ideation in game design. As part of their set of 4 card decks, [37] presents Superpower Cards for gamification of enterprise processes and services. The PLEX cards presented by [26] aim to encourage playfulness in design by building on the Playfulness Experience framework (PLEX) [23]. The authors found the PLEX cards useful for facilitating ideation and brainstorming when designing for playfulness. Similarly, [32] translated the Exertion Framework into 14 design cards called the 'Exertion Cards'. Their aim in designing the cards "was to create questions that designers use as thought-provoking suggestions to guide their creative process." The cards were colour coded for each of the 4 "lenses" of the framework. Through their workshops and evaluation of the Exertion cards, the authors reiterate the value of design cards as orienting devices [19], for supporting focus and helping to find common ground [1], and for facilitating the ideation process [9, 27].

Card-based design tools can be used to focus on one aspect of design, such as the Grow-A-Game exercises as part of the Values at Play project [1]. The aim of this project was to encourage designers to systematically consider "the moral, social, and political resonances of design features" of games. The cards were deployed for brainstorming activities in which participants combined cards from 2 or more categories. In this way, card-based tools can be used to focus on a specific issue such as values in game design, or in the context of the present research, the use of technology in HDBs to enable distanced play. To our knowledge there are no CSTs for the design of HDBs for distanced play. Given the opportunities for using card-based ideation tools for game design, in the following section we present the SMeFT decks as a tool to aid in the design of HDBs for distanced play.

3   THE SMEFT DECKS

The SMeFT Decks comprise four decks of cards: the Story, Mechanism, Function, and Technology decks, each representing a core facet of HDB design (see Figure 1). The decks were designed to be used as prompts for designers to brainstorm and ideate novel game design concepts for distanced play.

Figure 1: Example cards from the Story, Mechanism, Technology, and Function decks

In designing these decks, we reviewed three models that describe key elements of games in a design context: 1) the MDA framework [20]; 2) the Elements of Game Design [57]; and 3) Schell's Elemental Tetrad [44]. We found the structure of the Elemental Tetrad to be most useful for our purposes. In our work, we wanted participants to consider a game design broadly, incorporating not only the operational rules of the game but also how they connect to a game story or narrative and how that package is delivered through technology to support distanced play. Accordingly, we adopted the Elemental Tetrad as the basis for our card decks with one caveat – while we address three elements of the tetrad in the SMeFT Decks (technology, mechanics, and story), we replaced the 'aesthetics' component with a 'function' deck. Aesthetics – that is, the artistic direction of a game and how it appeals to the senses – were less important than the functions of

technology in our workshops, particularly given time constraints and the workshop goal of developing a game concept rather than a completed game design with art, sound and components.

3.1 Story deck

The purpose of the Story deck is two-fold: it sparks game ideas by providing potential themes, plots or premises that creatively shape the goals, presentation and interactions in a game, and it instills a lighthearted and humorous tone to the game development process. It was created during a team brainstorming ideation session. These ideas were then refined in subsequent meetings into a set of 27 cards, which invite participants to imaginatively apply the story prompts to their emerging game design ideas. The Story deck was pivotal in the workshops we conducted (see Section 4.1) for inspiring game design concepts and providing a context under which the mechanisms, technologies and functions could complement each other and interact.

3.2 Mechanism deck

The Mechanism deck provides participants with some basic "building blocks" of boardgame design [7] that shape how the game works; the "procedures and rules of your game" that help define what players' goals are, the winning conditions, and so on [44]. This deck was developed in response to feedback from a pilot workshop session, as participants requested help in understanding some of the different types of game mechanisms that are possible (e.g. area control, deduction, cooperative). Each card identifies and describes a common game mechanism, providing examples of representative games. This deck thus provides foundational understanding and structure to the ideation process.

The final set of 16 cards was informed by our experiences in teaching tertiary game design classes of the game design mechanisms that novice game designers find most intuitive and easy to understand. This deck is particularly important in helping participants create systems and actions in their game.

3.3 Technology deck

The Technology deck presents participants with a number of different digital tools that could be used to support distanced play. In Schell's work, technology refers to "any materials and interactions that make your game possible", including pens and paper [44]. For the purposes of this workshop, however, we focused on what he terms "high technology" – digital tools to support distanced play, including document cameras to capture a flat tabletop surface, microphones to share audio information, or a camera to take pictures of the board.

This deck of 16 cards was created through brainstorming, drawing from existing literature on the use of technological tools for HDB play [28, 40, 45]. The Technology deck is important for inspiring and educating participants, helping them to gain a sense of the technologies that are available to use in their design. Like the other decks, the technology cards were intended to be used as prompts only, and we encouraged participants to use their imagination to adapt or introduce additional technological tools beyond those listed on the cards.

3.4 Function deck

The Function deck prompts participants with ideas for how particular technologies can be used in boardgames to support different gameplay activities at a distance. This deck draws directly from the Hybrid Digital Boardgame Model [40]. Each card in this deck references one of the Model's domains of teaching, calculating, remembering, storytelling, timing, randomizing, housekeeping, and informing, producing a total of 8 cards.

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The Function deck is key to meeting the goal of our workshops – not only to give participants the tools to design a boardgame but to design a *hybrid digital* boardgame that can be used for *distanced* play. Understanding the roles that the technology can play in a boardgame is crucial for linking the Technology and Mechanism decks. Given the novelty of HDBs and technologically-mediated distanced play [30], this deck offers a foundational understanding of the work that technology can do, providing concepts for working in this specific design domain [42].

3.5 Using the SMeFT Decks

The SMeFT Decks are designed to be highly flexible, both in terms of how they can be used by participants during workshops and how they can be used by researchers and designers. In the workshops we conducted, the cards were intended to be used as starting points to inspire and enable design rather than limit it. While the decks are robust enough to entirely inform the design of a game, design ideas can also go entirely beyond any of the prompts on the cards. Participants might first come up with a 'big picture' game design, then see how the cards might inform the design of the game; alternatively, they might build a game from the bottom up by combining cards.

We trialled a number of ways of using the cards in the workshops. The most successful, card drafting, is described below. Other options that participants trialled include random draws, picking three cards from each deck, and looking at the full set of cards. Although looking at the full set allowed participants to familiarise themselves with all of the presented possibilities, we observed that this method tended to overwhelm them.

The card drafting method is a quick and playful activity that starts by giving each participant one of the four SMeFT Decks. Participants are each given one deck and are asked to draw a hand of five cards from it. They then pick a card from their hand that appeals to them. They keep this card and pass the remaining four cards to the next participant. This continues until each participant has a set of four cards, one from each deck. Then, each participant tries to come up with a game idea based on the four cards in front of them, sharing with the rest of the group. Participants may build on each other's ideas and can use some of these ideas for their eventual game design. We found this method most beneficial as it is fast, encourages a playful and collaborative atmosphere [37], and gives participants a good sense of the decks without overwhelming them.

Although we designed the SMeFT Decks for distanced play ideation workshops, they can also be used in a variety of other contexts. For instance, they might be adapted for workshops focused on other types of game or technology design in a playful way. They can be combined with other unique decks, and cards (and even whole decks) may be removed if they are not relevant to the task at hand. The SMeFT Decks can also be used with a wide range of participants of different levels of expertise; for instance, we used a stripped-down digital version of these decks in an online game design workshop with children aged 10-12 for a 2021 outreach activity.

4 METHOD

The SMeFT Decks were designed to support a series of workshops using a Participatory Research though Design (PRtD) approach. PRtD extends the design inquiry-based Research through Design (RtD) approach by involving users as designers [51]. Whereas in 'traditional' RtD projects, the design team creates, prototypes and evaluates novel products [56], PRtD invites users to ideate and explore novel designs. This empowers users at all levels of expertise and invites novel contributions beyond the imagination of the design team [48, 52].

We conducted a pilot workshop with eight participants. Based on feedback from this session, the Mechanism deck was added, the Technology and Story decks were refined, and a proposed Experience deck

was removed. This deck built on literature exploring design goals for hybrid and distanced play [4, 21, 28, 39], such as allowing customization, introducing skill-based challenges, and exploring the temporality or synchronicity of play. Although these represent important and interesting challenges for designers, feedback from the pilot workshop showed that these design goals were too abstract to apply at this conceptual early design stage.

Using the updated SMeFT Decks, we conducted nine subsequent workshops with a total of 46[1] participants. The workshops' goal was to prompt participants to explore design ideas for HDBs for distanced play. We report here on the use of and feedback on the SMeFT Decks from those workshops.

The project had ethics approval from The University of Melbourne (22108). Participants provided informed consent for their participation and received a small supermarket voucher as compensation for their attendance. The workshops were audio and video recorded and each workshop was attended by at least two researchers. Due to the risks posed by the COVID-19 pandemic, we invited interested participants to organize a group of 4–8 people to participate together, ensuring that we were not mixing different groups of people who did not otherwise have contact with one another. This led to our running more and smaller workshops than we had originally envisaged. We found that these more intimate workshops created a relaxed and friendly atmosphere in which participants were very comfortable sharing ideas and giving feedback to each other. Following local protocols and health advice, all participants and researchers had to be 2-dose vaccinated, check in to the building with government QR codes, and wear masks during the workshop. All physical objects were sanitised thoroughly after use.

4.1 Workshop structure

After the initial pilot workshop, we ran nine in-person workshops at our usability lab (see Figure 2). Participants were seated around a large table containing a large sheet of paper, pens, and markers for brainstorming their game design ideas. On another table, to the side of the room, a number of physical ideation tools were provided for them to use freely during the workshop. These included game components (coloured cubes and pieces, dice and cards including blank cards, regular playing cards, *Uno* decks and artistic cards from the game *Dixit* [41]), Lego pieces, paper, and post-it notes). We also displayed four sample technology products (a 360-degree camera, Polaroid Lab, document camera, and small portable projector).

Figure 2: Participants at a workshop designing a HDB for distanced play using the SMeFT Decks

After an initial introduction to the design activity, the components and technology, and an explanation of distanced play, participants were introduced to the SMeFT Decks. We explained each deck in turn and provided an example of a simple game design using the cards. We then gave the decks to the participants and asked them to use the cards as inspiration for coming up with a game design concept for distanced play. We stressed that the purpose of the cards was to inspire, rather than to constrain, their designs, and that

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[1] One participant joined two workshops.

participants were free to modify the cards or add their own ideas. In workshops with more than five participants, participants were split into two groups of 3 or 4 people for the design activity. The researchers were quietly available during this design task, ready to answer any questions participants had or to ask prompting questions if participants were stuck (e.g. "Are some players in the same location, or are all of them separated?"; "Is there any software that all players are required to have?"; "How does the game end?"; "Would each player have all of these pieces?"). After the design task (approximately 45 minutes), participants were asked to explain their game idea to us (and to the other group, in larger workshops). Each workshop took approximately 1.5 hours in total.

Although the workshops broadly followed the same structure, we made some minor changes as the project progressed. The most significant of these was implementing the card drafting method as a core activity from WS4 after seeing its success in WS3. For completeness, both the SMeFT Deck cards and the evaluation survey are included as supplementary materials.

4.2 Evaluation survey

At the end of the workshop, we asked participants to fill out a short evaluation form on the cards' usefulness in their brainstorming. This included both open-ended questions and rating scales. Participants rated a set of 11 statements on a five-point Likert scale from 'Strongly disagree' (1) to 'Strongly agree' (5). Statements were drawn from or inspired by relevant literature [e.g. 15, 16, 32]. Response options were semantically equidistant (Strongly disagree / moderately disagree / neither disagree nor agree / moderately agree / strongly agree), allowing them to be averaged [33]. We also asked participants to rate how useful they found each of the four decks on a unipolar scale with semantically equidistant values [33] from 'Not at all useful' (1) to 'Extremely useful' (5). Participants were also invited to provide free-text feedback on the workshop and to offer any suggestions for improvement. Results of the Evaluation surveys are reported in Section 5 of this paper.

4.3 Workshop notes and recordings

As well as notes written during and immediately after the workshops, we reviewed recordings of the sessions. Each researcher watched the recordings of four or five groups to explore the game they designed and the way they used the SMeFT Decks as part of that design. We highlighted key elements of these videos to share with the other members of the project team, and collectively reflected on how the SMeFT Decks contributed to the design and how they were used in the workshops, as well as on what we had learned from each workshop. These notes and recordings contributed to the game descriptions in Section 6 of these paper, and our reflections informed the discussion in Section 7.

5 FINDINGS: THE VALUE OF THE SMEFT DECKS

A total of 46 participants (16 women, 27 men, 1 Genderqueer, 1 Nonbinary, and 1 Genderfluid) aged between 20 and 55 (M=27, SD=8.75) participated across the nine workshops (see Table 1). Participants had mixed experience of game design and ranged from enthusiastic players to students of game design and people pursuing game design as a career. This variety of participants invited innovation and demonstrated the value of the SMeFT decks as Creativity Support Tools at all levels of game design literacy [55].

Table 1 Workshops, number of participants and game(s) designed. Games in [brackets] were not given a name by their designers.

Workshop (W)	Participants (P)	Game/s designed
1	4	Pat the Cat
2	5	Volcano
3	3	Domestic Dominance

Workshop (W)	Participants (P)	Game/s designed
4	8	BeavTown
		Defending The Egg
5	4	[no game designed]
6	6	[REAL Water!]
		Save the Library
		[Artefact Collector]
7	6	Rabbit World Domination
		Murder Village
8	6	Snapshot
		Offerings for Olympus
9	5	[Weather events]

Our findings, which report responses to the post-workshop evaluation survey, address participants' individual responses to the use of the SMeFT decks. Firstly, we discuss how participants felt the cards contributed to their own design ideas and workshop experience. Secondly, we examine how the SMeFT decks contributed to the overall group interactions and outputs. Finally, we address the role of the individual decks from a participant perspective.

5.1 SMeFT Decks as personal inspiration

Participants agreed strongly that they understood how to use the cards (M=4.62, SD= 0.73), that the cards helped them to get started designing the game (M=4.53, SD = 0.92), that they inspired new ideas (M=4.04, SD= 0.94) and that they prompted ideas that they would not have had without the cards (M=4.32, SD=0.97). They felt that the cards also helped them to articulate those ideas (M=3.83, SD=0.83), and did not feel that the cards restricted or limited their design ideas (M=1.89, SD=1.08) – *"Prompts were great!"* (P1W3); *"I liked the open approach enhanced by the cards"* (P14W1). One participant wryly noted that the cards gave them ideas *"but I didn't like those ideas!"* (P17W1). Unexpectedly, these results suggest that participants found the SMeFT cards themselves more useful than both the material game components (M=3.98, SD=0.96) and the example technologies (M=4.04, SD=0.94) that were available throughout the workshops, although both of these were still useful to them.

In open response to the question, "What was your favourite part of the workshop and why?", participants spoke about creativity and playfulness: *"It felt empowering to know I could come up with ideas that could work"* (P22W6). They enjoyed *"playing with all the game elements"* (P27W7) and *"felt the cards and paper/technology prompted creative thoughts and design"* (P30W7), although one participant felt that the Lego pieces on the table were a distraction. One participant referred to the other workshop participants as *"players,"* reflecting the playful and informal appeal of the workshops.

Several participants specifically discussed the value of the SMeFT Decks: *"I enjoyed drafting & looking through the cards at the start. Even though we moved away from many of the ideas we originally drew from the cards, they were very helpful in assisting with our initial brainstorming and inspiration"* (P29W7). A number of them expressed interest in the cards themselves and asked whether we planned to make them available for private use.

5.2 SMeFT Decks to support group design processes

In terms of working as a group, participants agreed that the cards helped their group to focus (M=3.7, SD=1.03), work together (M=3.74, SD=1.06), and find consensus with other participants (M=3.6, SD=1.08). They felt that using the cards helped the group to design something new or unusual (M=4.17, SD=0.95). These findings support the use of the SMeFT Decks for group ideation of innovative games even for people without game design expertise.

The experience of designing in a group featured strongly in participants' favourite parts of the workshop: One participant highlighted their enjoyment of *"discussing and creating this game with my friends. Hearing ideas from my friends and incorporating my ideas with theirs"* (P5W4), while another *"enjoyed the collaborative creation, bouncing ideas off each other"* (P14W1). This sense that the games were designed and refined by the group rather than by an individual, and with the help of the SMeFT Decks, was particularly strong: one participant pointed to the process of *"changing the game based on the other players' suggestions or the new SMEFT cards we looked at"* (P24W6) as among their favourite parts of the workshop, and another shared *that "the cards really helped our group begin designing and discussing the game"* (P40W9).

5.3   Utility of the different SMeFT Decks

Participants considered the Story deck to be the most useful of the decks (M=4.04, SD=1.08), followed by the Mechanism (M=3.74, SD=1.11), Technology (M=3.63, SD=1.07), and Function (M=3.3, SD=1.18) decks. Each deck was rated 'Extremely useful' by at least ten participants. There was high variability across sessions; for example, the practising game designers were less interested in the Mechanism deck (M=1.75, SD=0.5) than other groups.

These figures particularly highlight the relative difficulties that participants experienced in using the technology deck for ideation. Several participants commented that they felt they didn't know enough about any of the technologies to describe how they might be implemented. Others suggested that we could expand the list of technologies (P20W2) or require participants to physically interact with technology products as part of the workshop (P22W6), although some found even the small display of technology products *"cool but a little overwhelming"* (P43W9). Although we stressed that they should take a lightweight approach to prototyping – "leave the *how* to us, just tell us *what* it needs to do" – this seemed to be the most difficult aspect of the design process and we found that several designs were underdeveloped in this area. Nevertheless, several participants embraced *"the freedom of ideas and Wizard of Ozzing allowed"* (P10W4) to propose novel hypotheticals that make use of the technology cards in imaginative ways.

Although there were no specific comments about the Function deck, participants referred to it during the workshop. They felt that the functions were often implicit in their design, particularly in the technology or mechanics selected, rather than being something that they explicitly designed for. Although there was lower conscious engagement with this deck than we had expected, these key concepts were nevertheless reflected in the final design concepts.

Some participants felt that they would have liked more prompts about what each of the decks were for. Participants suggested that we *"label the cards or provide a legend for players to reference about what components each were"* rather than simply using icons (P30W7) or provide a written sheet to reinforce the workshop's objective (P33W8). On the other hand, they generally found that *"the [card] prompts were helpful and thought provoking and mind opening"* (P25W6).

6   DESIGNS

In this section, we present four designs from the workshops. As well as providing an overview of the designed game, we reflect on what we learned from observing the session and how it influenced our thoughts about designing for distanced play. We present these designs not because they were necessarily the 'best' designs but because they encouraged us to reflect on the nature of distanced play and on how the SMeFT Decks can support the design process.

6.1 Pat the Cat (Workshop 1)

Table 2 SMeFT Cards used in *Pat the Cat*

Deck	Cards Used
Story deck	S16 "Toddlers vs Cats"
Mechanism deck	M05 Card Drafting (not really implemented)
	M09 Take That
Function deck	F02 Calculating
	F05 Timing
	F08 Informing
Technology deck	T04 RFID tags/QR Codes
	T13 Holographic Cubes

6.1.1 Game overview

Pat the Cat is a semi-cooperative game for four players. One player, who must be distanced from the other players, takes the role of the cat; the other three, who may be co-located, are toddlers. At the start of the game, the cat is allocated a secret goal, e.g. "eat the cat food" or "have a nice cuddle". Their task is to manipulate the toddlers to help them achieve their goal – but toddlers are easily distracted, don't understand cause and effect, and have their own goals to contend with. Toddlers draw cards with mandatory and optional ("must" and "may") actions that may help them to achieve certain goals which include emotional regulation; these are selected and 'programmed' in advance. The cat can observe what the toddlers are doing and the effects of these actions (one participant suggested a "meltdown timer") but has limited ways to respond (e.g. scratching, purring, hiding). These behaviours are reflected to the toddlers through a display, without any clear statement of cause and effect. The game is short and chaotic, and is played over a limited number of rounds.

6.1.2 How technology is used to achieve distanced play

The participants proposed using unique QR codes on cards to enable the system to recognise which cards had been played. This is similar to the method used in the published game *Soviet Kitchen Unleashed* [50] where the system uses information on cards for tracking as well as for calculation purposes.

This group acknowledged that they struggled to see how to implement technology in their game. Their discussions focused on "doing something you couldn't do with a normal game" as well as the limitations of distance, particularly the risk that the cat player might not have enough involvement to maintain their interest. They felt that the physical distance between the players was supported thematically by the distance between cats and toddlers who, they suggested, are "just on a completely different page".

The technology in this game had distinct functions. It acted as a calculator for the things that the cat observes but the toddlers are unable to abstract; it timed the limited number of rounds in the game; and it informed the cat about the meltdown timer's progress.

6.2 Save the Library (Workshop 6)

Table 3 SMeFT Cards used in *Save the Library*

Deck	Cards Used
Story deck	S11 "The library is burning!"
Mechanism deck	M07 Cooperative
Function deck	F02 Calculating
	F05 Timing
	F06 Randomising

Deck	Cards Used
Technology deck	F08 Informing
	T02 Microphone & Speaker
	T04 RFID tags/QR Codes
	T06 Proximity Sensor

6.2.1 Game overview

In this semi-cooperative game, the players have been sent to rescue books from a burning library. Each player has the aim of rescuing as many books as possible, but attracts a bonus for rescuing books of a particular genre (e.g. science, history, romance, young adult). Players are unable to see one another due to the smoke in the library (thematically supporting distanced play) but may be able to hear one another's footsteps or voices, and potentially to speak with one another, if their pieces are in sufficiently close proximity on the library layout (although on different physical boards). Sound effects are louder as players get closer to one another. A lighthearted twist that affects the pace of play is presented by the library protocols – all books must be 'scanned' out of the library before they can be removed.

6.2.2 How technology is used to achieve distanced play

There are two main uses of technology in this game. Firstly, the game uses location/proximity sensing to establish where the player is on the board in relation to books as well as to other players' locations. This drives the sound effects and possible communication between players. Secondly, the book scanner is used to moderate the pace of play and create a shared record as the basis for final scoring.

This group was particularly effective, designing two different games in the time allowed, and enthusiastically embraced the notion of distanced play. They successfully connected the theme of the game to the initial function prompt (F05 Timing) and to the limited and somewhat unpredictable use of technology to connect the players, informing them about the progress of their book retrieval, and calculating factors like distance which were otherwise obscured by their inability to see one another's pieces.

6.3 Volcano (Workshop 2)

Table 4 SMeFT Cards used in *Volcano*

Deck	Cards Used
Story deck	S20 "One of these towns is going to be submerged by a new dam. Make sure it's not yours!"
Mechanism deck	M01 Dice Rolling
	T06 Proximity Sensor
	M10 Variable Board
Function deck	F02 Calculating
	F05 Timing
	F08 Informing
Technology deck	T03 Mobile/Micro Projector
	T09 Smart Lights

6.3.1 Game overview

The game models the eruption of a volcano, with the players trying to save their own pieces/map area/village and to influence the volcano's lava flow to consume other players' sectors of the board. A "Doom Tracker" counts down the time until the volcano erupts, signalling the end of the game.

Volcanic eruptions and the resulting lava flow means players lose villagers from their town. Players cannot directly kill other players' villagers, but they can displace them (e.g. into the path of the lava as a form of sabotage!). Players use a 12-sided die (d12) to move around their board, while a 4-sided die (d4), which

players pay to use, represents the 'god's favour' and is used to influence the lava flows. This has symbols on it for randomising, to determine a re-roll, and so on.

6.3.2 How technology is used to achieve distanced play

This game has a variable board and can be played distanced or in person. Made up of pieces that fit together, sections can be flipped over to reflect that they are controlled by a distanced player. The flipped board sections feature smart lights, and pieces communicate with the boards through proximity sensors or magnets. Here, the flippable board segments streamline housekeeping tasks including tracking which player(s) are present and which are distant. The smart lights communicate the locations of other players' game pieces.

Technology in *Volcano* focuses on calculating the route of the lava flow, based on the influence that players exert over the board, and communicating it and the location of other players through the smart lights. The Doom Tracker has a timing function.

6.4   REAL Water! (Workshop 6)

Table 5 SMeFT Cards used in *REAL Water!*

Deck	Cards Used
Story deck	S20 "One of these towns is going to be submerged by a new dam. Make sure it's not yours!"
Mechanism deck	M10 Variable Board
Function deck	F02 Calculating
	F05 Timing
	F08 Informing
Technology deck	T03 Mobile/Micro Projector
	T16 Something else?

6.4.1 Game overview

This group used the same story prompt as the *Volcano* group. Although the game idea was less realised than some, we have included it here to compare two reactions to the same prompt and for its innovative use of technologies. In *REAL Water!*, players must strategically place towns and adjust the topography on a physical map to reroute the overflowing dam water to stop their towns from flooding, while ensuring the flow of water to certain important facilities (e.g. water towers or trade points) and attempting to flood their opponents' towns. The water flow may either be present throughout the game, slowly trickle down over time, or there is a countdown to when the flood begins.

There was unresolved discussion about whether an individual piece represented a single worker or a group of workers, as well as whether the game was cooperative or competitive. Towards the end of the session, the group discussed whether an alternate, dystopian theme of climate change and slowly rising water might be more appealing.

6.4.2 How technology is used to achieve distanced play

Members of this group were intrigued by the potential to physically configure a board using blocks or rods underneath a flexible mat to create hills and valleys. Each player would have a special mechanical board with a randomised topography controlled by an AI that determines the elevation of various blocks on the map. When one player builds towns or smaller dams in the form of physical blocks (the main resources), or cuts down trees, this is mechanically reflected on their opponents' boards, either in real-time or at a set time point. Alternatively, there could be a 'fog of war' view where players take the role of a 'worker' on the board and only see the mechanical changes in the board in their immediate vicinity. This game inspired discussion of

different ways to represent water – the group considered magnetic slime, projected/modelled water, blue lights complimented by sounds, or "it'd be fun if there was real actual water".

This group saw timing as the key function of technology, as well as synchronisation of information across boards. They anticipated that a computer host would calculate and show the water flow based on the topographic changes on each map as the game developed.

7 DISCUSSION AND REFLECTION

A key element of the Research through Design approach is the opportunity to reflect on lessons learned through the design process and to conceptually reframe the design space or problem through the process of design [56]. We found that the workshops we ran with the SMeFT Decks transformed the way we had thought of distanced play by extending our understanding of the design space to consider the affordances as well as the disadvantages of this kind of play, to explore the opportunities for material pacing through the game components, and to focus attention on the hybrid interplay between the digital and physical elements. Furthermore, they demonstrated that not all players need to be distanced from one another. These understandings helped to reframe our understanding of the context and experience of distanced play.

Firstly, the SMeFT Deck workshops broadened our **understanding of this design space** both through the creative design solutions that participants explored and through the opportunity to reflect on and discuss those solutions. We moved from a fairly simplistic model of what hybrid play might look like, mostly involving videoconferencing and robot arms, to a deeper understanding of how technology can be used to achieve different functions in a playful setting, as well as and how this can support the game's theme and contribute to a more compelling gameplay experience.

Secondly, our participants led us to consider **the affordances of distanced play**. Even in our first workshop, the designers of *Pat the Cat* clearly focused on what was special or different about distanced play and how that could be supported by game mechanisms and theme. They particularly connected distanced play to issues of communication and of controlling information, as did other groups (including the designers of *Save the Library*). Participants recognised the potential for personalised information sharing in distanced play – where technology offers the possibility of private communication with and between players – as well as the risk of delays due to network infrastructure. These groups made limited communication a feature of their games, rather than something to be overcome. The designers of *REAL Water!* extended this, discussing whether the game had to be played in real time at all or whether it might be an asynchronous experience where players might 'visit' the game over a period of weeks. This encouraged us to consider the dimensions of time and space discussed by [34] and [28], as well as the distinct affordances of hybrid environments and how they differ from those that are purely physical or virtual [29].

Consideration of the affordances of distanced play also led us to consider the affordances of the physical game pieces. In *Save the Library*, the **material pacing** provided by the need to scan books out of the library avoided potential problems where individual players may complete tasks more quickly or slowly than others. The book scanners provided a sensible moment for managing the pace of the game and aligning players' activities.

As well as considering the materials of the game, it is valuable to focus on the **hybrid interplay between digital and physical elements**. Several groups struggled to design a hybrid game, instead designing a game that was either essentially digital or essentially physical; another was unable to move past an augmented reality concept that combined Pokémon Go!-style elements with a murder mystery plot. Rogerson, Sparrow and Gibbs have discussed the need for hybrid games to be designed as hybrid from the start [40] and for the digital tools to add something beyond token "gimmicks" to the game [39]. Such design focus may also help to

alleviate the risk that players' attention may be diverted to a video stream and away from the physical game components.

A surprise to us all was the realisation – which connects with other work on partially distributed teams in the context of hybrid work [34] - that **not everyone needs to be distanced.** We particularly liked the use of different sides of the variable board in *Volcano* to show which areas were controlled by a present player and which by a distanced player. Similarly, *Pat the Cat* was designed in a way that had multiple players who could be co-located on one team (the toddlers) and one player with a "God mode" view of the game activity (the cat). Several other games referred to this "God mode" concept, referencing games like *Mysterium* [35] where one player has full knowledge of the game state, balanced out by restrictions in how they can communicate.

Consideration of the **disadvantages of distanced play** – particularly the need to potentially synchronise players' activities across multiple distanced boards – led us to explore how they too might be reframed. *Volcano* (W2) was quite an exciting design, with high interaction that could occur at scheduled times (e.g. the movement of opponents' pieces). *REAL Water!* (W6) was perhaps the most technically ambitious game design, using a digitally modelled and physically created 3D board. Although it required complex synchronisation tasks, other designs avoided the need for heavy synchronisation tasks through clever integration of thematic elements such as the Fog of War-like effects of the smoke-filled space in *Save the Library*. Considering the alignment of theme and function may help to answer the question of what forms of communication are necessary and when.

Building on this understanding, the designs and discussions **reframed the notion of distanced play** not as a disadvantage that people must overcome when they are forced to be apart but rather as something that can be fun, innovative, and a first choice for play. Our participants were excited about the possibilities of distanced play as a novel form of play rather than as a mundane necessity. Nevertheless, they found it challenging to design for such a novel context. This pointed us to the necessity to focus on what distanced play adds to the experience of play rather than just what it loses.

Finally, we consider the role that **the cards themselves** played in this project. The majority of groups chose to start their design with a story card – and there was particular interest in a small number of cards – Toddlers vs Cats (S16), the overflowing dam (S20), and the library is burning (S11). Several story cards were not used in any designs (e.g. S08, S10, S25). Similarly, some functions such as Teaching (F01) were under-represented, perhaps because this function might be added after the game was designed. No groups set out to design a Route Connection (M06) or Legacy game (M15) and no games used a Smart Watch or other body tracking device (T05) or a game that used Conductive ink or thread (T11).

We found that the Story deck worked particularly well in combination with the Mechanism deck to give a basic game concept; there is scope to use just these two decks as the starting point for design of a traditional form boardgame, or to implement them in combination with other decks to achieve the goals of a particular project. For example, a project with a focus on designing games about environmental sustainability might add a custom deck of cards focused on core concepts from this domain such as reuse or carbon cost. Although we designed the decks specifically to inspire designs for distanced play, our experience of observing the workshops suggests that there is potential to use some or all of the card decks for designing in-person hybrid play experiences.

7.1 Limitations and Opportunities

There were three main limitations that we identified through this process. Several participants commented that they would have liked to have more time to work on their game designs. Additionally, several participants had difficulty imagining what distanced play might involve. Despite the subject of this research, we did not explore what a distanced 'distanced play' workshop might look like. Finally, although we valued

the input of all participants, we would have liked to engage more deeply with game designers to understand what perspectives they brought to the project.

Several participants noted that they wanted more time to realise and explore their game design concepts. One way to address this would be to create a distanced play game design reference group and further develop and refine specific designs through an ongoing series of workshops. A challenge here is participant selection and recruitment: we found that there was considerable variation between the groups in their understanding of the workshop goals and their realisation of them in their games. For example, some groups designed fully digital or fully physical games – typically, these were groups who were keen to just get started, and who made minimal use of the Technology and Function SMeFT Decks. An advantage of this extended approach, however, could be in encouraging greater use of the supplied game components and example technologies, and in allowing the researchers to source examples of technologies of interest or build working prototypes of the game designs. A disadvantage is that experts like the four game designers we approached may be less available than others for this extended activity.

Within the current workshop structure, there was an opportunity to spend more time building shared understanding with participants of what "distanced play" might mean, exploring this in more specific detail before moving to the design process. We remain ambivalent about the value of a longer introduction to this concept, however, as it might bias the participants into thinking that there was only one way to 'do' distanced play. The extended workshop series approach also addresses this limitation. In a series of workshops, there would be scope to physically separate participants to explore the play experience, giving each player discrete physical prompts or game components.

Further exploring how distance affects participation in playful group activities, we experimented with using a digital version of the SMeFT Decks for an online workshop as part of an outreach activity. Without a shared view of the game space, participants struggled to engage in the joint activity. In face to face workshops, the physical game components helped to provide a focus for the design; any online sessions would need to carefully consider how to integrate these objects in meaningful, shared ways and how to use technology productively. For example, providing participants with a document camera might enable them to share a view of their game components, cards and any associated sketches while exploring how these technologies could be used to enact distanced play.

Finally, it is a struggle to engage with game designers, particularly in smaller markets. It was interesting to us that the game designers who participated in Workshop 5 were the only group to not design a game at all; instead, they spent the workshop discussing ideas for potential uses of technologies to deliver hybrid – and sometimes distanced – play. We are keen to engage with this group further as our project progresses.

8 CONCLUSION AND FUTURE WORK

We have introduced the SMeFT Decks, a flexible, card-based ideation tool for the design of hybrid digital boardgames for distanced play. Feedback and game design concepts from 46 workshop participants suggests that the SMeFT Decks are useful and effective for sparking creative game design ideas in a collaborative workshop setting. Our use and evaluation of these decks is ongoing. We plan to further explore their use with experienced game designers, and to implement them in a tertiary game design education setting. We hope to further build on this feedback to enhance the usefulness of the Technology deck, such as by providing examples of how different tools could be used.

Hybrid games for distanced play represent a novel design space brimming with opportunities for researchers, game designers and players. This paper demonstrates that the SMeFT Decks contribute not only to game design but also to understanding this unique design space. By combining the playful nature of

Creativity Support Tools with a participatory Research Through Design approach, we have provided a fresh vision of the practical possibilities for this fascinating and rapidly developing area.

ACKNOWLEDGMENTS

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