"Are We Now Post-COVID?": Exploring Post-COVID Futures Through a Gamified Story Completion Method

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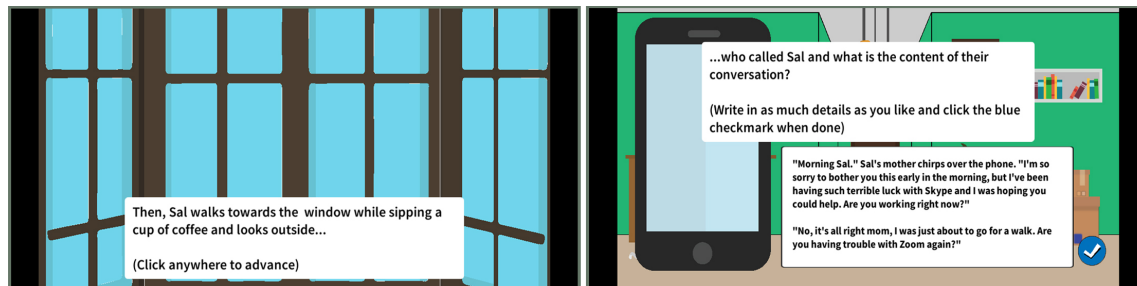
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Fig. 1. Two scenes from the hybrid gamified/story completion game used to explore visions of a post-COVID world.

COVID-19 has heavily impacted our lives. To date, the ongoing pandemic continues to cause dramatic societal changes and raises shared sentiments of uncertainty for our future. As such, however, COVID-19 provides opportunities to explore futures through speculative research. Here, we gamify the story completion method (SCM) to explore futures post-COVID and ask 37 participants to play a day in the life of Sal in a post-COVID future. The game asks participants to describe what Sal sees, hears, or does throughout a day based on multiple story stems. Our analysis reveals narratives of post-COVID futures as *business as usual*, *back to basics*, or *everyday chaos*. Notably, these narratives raise concerns about privacy loss and increased militarization, but also envision futures post-COVID that reclaim stronger bond with nature and family. We discuss the lessons learned from gamifying the SCM and the temporal implications of performing speculative research during evolving dramatic events.

CCS Concepts: • **Social and professional topics** → *Cultural characteristics*; • **Human-centered computing** → *User studies*; • **Software and its engineering** → **Interactive games**.

Additional Key Words and Phrases: COVID-19, gamification, story completion method, speculative research, research fiction, speculative design, design fiction, game design, uncertainty

1 INTRODUCTION

COVID-19 has recently spread worldwide and developed into a global pandemic [41], which rapidly escalated in thousands of contagions [110], and heavily impacted our daily routines [59]. Since its emergence, our society has reacted with resilience [46, 82] and shared efforts [48] to counter its further spreading. Meanwhile, the emergence of COVID-19 has provided ground for academic research of diverse nature (e.g., neuroscience [5], robotics [93], social sciences [119]). As a consequence, there are now increasing calls for interdisciplinary research on COVID-19 (see [69, 124]) to advance the scientific discourse on how the current pandemic impacts our social lives [2], and how we can cope with it [95].

Within HCI, Dalsgaard and other colleagues [42] have reflected on how and what researchers and practitioners in our community can do *"right now to help"* advance research on COVID-19 from an HCI and interaction design perspective. Among the envisioned efforts, Dalsgaard and colleagues propound the idea of HCI research efforts that can help (re)imagine and (re)shape our future, particularly through *"methods such as scenarios, design fictions, and participatory design involving the people with whom we will share this future world"* [42].

Here, we "test" the vision of Dalsgaard by exploring the implications of running speculative studies under dramatic events, specifically during the COVID-19 pandemic [9–14, 16, 28, 47, 52, 117]. We explore possible futures post-COVID using a hybrid approach that embeds a story completion method (SCM) [32, 35, 68, 78, 105, 118, 127] in gamified settings [43, 44]. To do so, we create gamified story completion tasks (SCTs) using *StudyCrafter*[1] [26, 51, 64, 87, 97], a tool created with the purpose of enhancing and supporting gamified research. The resulting game has resemblance with recent work introducing gamified "vignettes" (i.e., *gamettes* [87]). However, the primary mean of interaction in our game is text-based input, much like in interactive fiction games [88], for instance like *Zork* [89].

We recruited 37 participants through multiple social media (e.g., Facebook, Twitter) and online writing groups (e.g., Reddit), and asked them to play our game to provide perspective on what a future post-COVID world "could be like". The game is structured on multiple "scenes" (see Figure 1) composing a day in the life of Sal, and contains six prompts (or story stems) through which participants can construct narratives of a future world post-COVID; notably, we did not indicate at any point in the game "how far" in time this future is or should be.

Our study around COVID-19 has implications to both gamified, social constructionist, and speculative research. First, our approach shows that SCM and gamification can be combined effectively to engage people in venting their visions, concerns, and hopes about the future in speculative studies that tap into current dramatic events. However, we also show how such a kind of time- and context-sensitive speculative study may yield results that retain the status quo. This, in turn, problematizes the scope of speculative research that wishes to question the status quo to foster social change [86], thus potentially impacting participatory design fiction studies that have a similar scope [7, 80]. Based on the lessons learned, we provide methodological considerations that will help HCI researchers approach the design and interpretation of speculative studies that are bound up with time- and context-sensitive topics.

2 BACKGROUND AND SCOPE

We inquire futures post-COVID at the intersection between social constructionism (e.g., [35]) and gamification (e.g., [43]). The scope of our inquiry is to unfold (socially constructed) visions of a future post-COVID world and provide perspective on how these visions speak to speculative research [47]. Furthermore, as we extend SCM studies by means of gamification, our work has methodological implications to both research methods. Next, we briefly review SCM and gamified research.

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[1]https://studycrafter.com/

2.1   SCM and Social Constructionism in HCI

The story completion method (SCM) originated from projective tests [35]. Projective tests have been particularly employed in developmental psychology (e.g., [106]), where stories generated (typically through role-playing with dolls) have been used to measure levels of attachment in children. These tests stem from psychoanalytic theory (for an introduction, see [50]), resting on the assumption that through such tests we may gain access to unconscious aspects of the personality and psychopathology of clients, both in clinical and therapeutic settings (e.g., [105]). Amongst the most popular is the 'Thematic Apperception Test' (TAT) [90], where clients are shown evocative and ambiguous images, and are asked by therapeutic practitioners to write stories about these. In these settings, the stories are used to make clinical judgements about individual clients.

Following the work of Kitzinger and Powell [78], the SCM has been adopted by a range of feminist psychologists, exploring topics related to gender, sexuality, and intimate relationships (see [32]), predominantly from a social constructionist perspective [20, 116]. Here, rather than focusing on individual psychological meanings, qualitative researchers consider the *social discourses* that participants use in making sense of a particular scenario. In HCI, this has recently been extended to include matters of technosexuality, with Wood et al. [127] exploring narratives of virtual reality pornography, and Troiano et al. [118] considering how participants wrote about futures with sex robots. The use of the SCM in HCI allows us to consider crossovers with research fiction (e.g., [10]) and speculative design [47], often contributing to develop critical perspectives towards technological futures. Here, we follow the above mentioned efforts who investigated speculative futures in HCI through SCM, and use this social constructionist technique to explore visions of futures post-COVID. As we gamify the SCM via gamification tools (i.e., *StudyCrafter*), we also speak to research that explores possible extensions of the SCM.

2.2   Extending the SCM via Gamification

Novelty is a key feature of SCM research. Requesting participants to write a story, either from a first or a third person, is by itself distinct from collecting self-reported data, and can generate creative responses from participants [35, 118, 127]. Recently, researchers have explored meaningful extensions of the SCM. For instance, Troiano et al. [118] asked each half of their participants to write stories about futures with sex robots, introducing two distinct perspectives (i.e., the human and the robot perspective), and examined how the speculative narratives generated by participants differed based on these. Hayfield and Wood [68] combined the SCM with a task using the online platform Bitstrips [125], where (after letting participants complete their stories) they asked participants to generate an avatar of their protagonist, and consider how social and cultural understandings inherent in the stories were selectively reproduced in their visual data. Many participants reported to enjoy the avatar generation in the Bitstrips study.

Therefore, adding new elements to the SCM, such as pictures or other media, can introduces engaging elements to participants as well as promising opportunities for novelty in SCM analyses. There is still considerable room in the SCM for methodological innovation. Here, we propose that the creative and free-form nature of SCM (e.g., [127]) may very well map with the playful nature of games [112] and thus extend the SCM by means of *gamification* to inquire post-COVID futures. Next, we briefly review gamification research and the use of gamified tools in HCI to provide context.

2.3 Gamification and Gamified Research

Deterding [43] defines the term *gamification* as follows: *"gamification's guiding idea is to use elements of game design in non-game contexts, products, and services to motivate desired behaviors"* ([43], p. 1). As of late, the ubiquity of gamification has been noted in the increase of gamified applications (for a review, see [79]), including an ever expanding adoption of gamification as a research tool [91]. As such, games and virtual worlds have been increasingly proposed as tools for research in multiple disciplines (e.g., situation awareness [31], e-Health [103]). In their special issue, Calvillo-Gámez et al. [24] present a range of experimental research examining phenomena from different disciplines, arguing that the richness and complexity of gaming environments, alongside the potential for controlled conditions, provide fertile ground for intricate social research. This has been anticipated by Bainbridge in 2007 [6] who proposed that the intricacy and popularity of virtual worlds provide a site for social research that is increasingly relevant and contemporary. In light of this, Harteveld and Sutherland [65] identified three key affordances of game and game-like environments for social and behavioral research:

(1) *Immersion*: game-based research takes place in virtual, yet authentic settings, with minimized risk for participants.
(2) *Control*: games provide controlled conditions for research that yield experiential and behavioral data.
(3) *Outreach*: games appeal to wide audiences and facilitate both recruitment and participation in research studies.

While the majority of the work in this area leverages games and game-like environments as a study environment, several efforts have focused on *directly* gamifying research instruments and methods, in particularly surveys [64, 71], and with success. For example, Harms et al. [61] described how their participants reported more perceived fun in gamified surveys compared to traditional online surveys; their participants roughly spent more time completing the gamified survey and reported a higher willingness to recommend the gamified survey over the traditional one. Others focused on gamifying an experiment [66], simulating decision tasks [87], studying vignettes [72], or design fiction [37].

The effort that is most closely associated with ours is by Fatehi et al. [51] who, in fact, explored the gamification of the aforementioned 'Thematic Apperception Test' (TAT). They did this with the help of *StudyCrafter*, a tool created with the intent to facilitate gamified research, which is being increasingly adopted in HCI research (e.g., [26, 63, 87]). The user-friendly programming/design interface of *StudyCrafter* allowed the researchers to use a range of creative scenarios in which to administer the test, for instance by presenting the protagonist as a "freelance writer" or an "art critic", and inviting participants to complete their stories either as a magazine article or a conversation. They observed that the gamified aspects of TAT increased both participants motivation and engagement, as well as leading them to generate longer, higher "quality" stories than in a more traditional "pen-and-paper" study settings. Similar to this work, we (1) gamify an instrument to collect qualitative data, which is relatively uncommon; (2) leverage StudyCrafter; and (3) make use of interactive storytelling to set up a creative scenario.

We note that the term "gamification" was heavily criticized (see [18]) when it was first introduced because it was seen as "manipulative and only capable of addressing simplistic extrinsic personal motivations" [36]. Scholars resorted to other terms to avoid the negative connotation, in particular gamefulness [121]. However, the field has matured [91], and similar to another closely related disliked term "serious games" [62] (or even "computer science" for that matter, see [114]), the term has stuck and is now widely used. We define and approach gamification from this mature perspective, one that goes "beyond points, badges, and leader-boards" [29, 121]. Specifically, we gamify the SCM to provide participants with a visual game-like experience that enhances curiosity and role-playing [53, 56], and allows for exploring new identities and roles [45].

2.4   Why Gamify SCM?

We see two reasons for why gamifying the SCM could be both methodologically sound and favorable: (1) as discussed above, gamification can help create engaging methods of data collection, thus suggesting the promise for create engaging SCTs too, and (2) as gamified tools have shown to effectively engage diverse audiences in research (see [60]), a gamified approach to SCM studies may extend participation beyond communities of writers (e.g., [118, 127]). We argue that there are opportunities to apply gamification to (textual) qualitative research methods, such as the SCM, and that such combination of SCM and gamification may lead to interesting outcomes in participant's stories. Notably, we analyze the results of such hybrid gamified SCM approach, from both a social constructionist [35] and literary criticism (see [101]) lenses. Furthermore, as previous work suggests that gamified speculative studies can effectively combine *"player enacted mimesis...with narrative diegesis...to produce powerful explorations of highly complex topics"* (see [37], p. 14), we see our approach as having potential implications to speculative research [4, 7, 47].

2.5   Envisioning Post-COVID Futures

The scope of our gamified SCM study is to explore how people view, invoke, and speculate about a future post-COVID world. As such, our study is aligned with the scope of research that is concerned with anticipating (e.g., [117]) or conjecturing upon (e.g., [17]) the future. In HCI, the research areas that concern with technological and societal futures are *design fiction* [10] and *speculative research* [47]. While similar in scope and often tangential to each other, the former puts emphasis on how society can transform through technology and its appropriation (e.g., [117]), while the latter accounts for technology within the grand scheme of societal change [7]. As such, compared to design fiction [113], which focuses on conjectural discourses where "design" is central, speculative research is instead focused on inquiring socially-constructed ideas that can help develop *"alternative approaches and sensibilities that take futures seriously as possibilities that demand new habits and practices of attention, invention, and experimentation"* ([104], p. 2). In that respect, we align the present study with the scope of speculative research and inquire socially-constructed post-COVID futures in game settings. Our scope is to identify how the "shared" socio-cultural narratives [22] emerging from our study may (1) reveal insights and perspectives on how we speculate about futures under current dramatic events (here COVID-19), (2) help us reflect on how the "narrative template" (i.e., *"process of collective remembering and interpretation as a series of dialogic realisations of an underlying cultural representation of events"*, [111] p. 61) underlying future visions of post-COVID are shaped and impacted by these dramatic events. This in turn, will have methodological implications to speculative research (and design fiction too), particularly the one interested in fostering social change through speculation [86] and identifying possible futures that digress from the status quo [104]. Last, the speculative research we propose here is bound up with the evolving COVID-19 events and thus will be naturally *"presenting a design fiction as credible and believable"* [39] to participants. However, we acknowledge this as a potential limitation in our study, in which notions of mundanity [118] and plausibility [126] may impact speculative visions of post-COVID futures.

3   GAMIFYING THE SCM VIA STUDYCRAFTER

Our gamified SCM approach bears similarities with *research through design* [128] approaches, in which we conduct our speculative research by (1) leveraging the free-form and creativity-inspiring features of a SCM and (2) embed five SCTs that reflect those features into a design artifact (here a video game). Furthermore, to not compromise the free-form nature of SCM, we reason about its gamification "beyond points, badges, and leader-boards" (see Section 2.3). In designing our gamified SCM, we were initially inspired by the alternate reality game called *World Without Oil* [73].

Its objective is to flash discourses about how to plan strategic solutions to a potential (and realistically possible) future worldwide oil shortage. In the same spirit, we designed a game that could spark a discussion around how we imagine a future post-COVID and how we see ourselves coping with that reality. However, differently from *World Without Oil*, we did not set a "future" scenario a priori for players to navigate through. Rather, we leveraged the SCM to let future scenarios emerge from conjectures and speculations of participants' socially-constructed views of post-COVID futures. After multiple group discussions, we decided to title our gamified SCM *"What's Next?"*; we found this title to be simple and effective for conveying the main question underlying the game to participants (i.e., what comes after the COVID-19 pandemic?). Also, differently from *World Without Oil*, we did not engage communities in shared conversations, but rather let people participate individually in a gamified SCM study, and organically developed their shared view of a post-COVID future through thematic analysis [33]. The way in which participants could develop their narrative of a post-COVID future was by playing a day in the life of Sal in a post-COVID world and, while prompted by multiple story stems, respond to these in form of writing, to explain what Sal hears, sees, or does in this (speculative) future reality. We picked the gender-neutral name Sal for the protagonist of our gamified SCM, inspired by Weiser's work in pervasive computing (see [123], p. 9). Importantly, as anticipated earlier we did not specify to our participants "when" or "how far in time" this post-COVID future takes place (e.g., 2030).

3.1 Designing "What's Next?" in StudyCrafter

We designed our gamified SCM using *StudyCrafter* [26, 51, 87]. We chose *StudyCrafter* to design our gamified SCM for two reasons: (1) it allows to easily design a gamified environment for research (e.g., [87]), without the need for prior programming or design knowledge, thanks to its user-friendly interface (see Figure 2 and 3); (2) it automatically logs
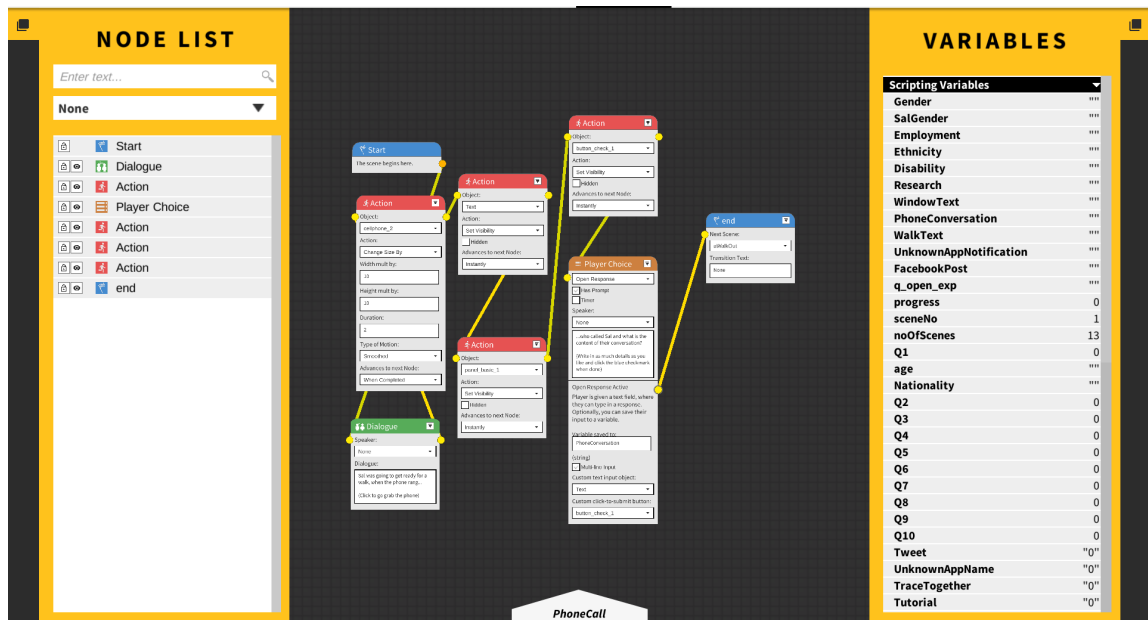

Fig. 2. The *StudyCrafter* scriptor interface, with two interactive menus to control list of nodes (i.e., programming "blocks") and variables (the values contained in the "blocks".

players' data and stores it in a .csv file for later data analysis. *StudyCrafter* features a *scriptor* (Figure 2), which allows for creating sequences of scenes, animations, and interactivity with a programming systems similar to software like *Pure Data* [98] or *Max/MSP* [85] (also known as *visual* or *patch* programming software). The *layout* interface (Figure 3), instead, allows for selecting various art assets (e.g., interactive objects, sprites, backgrounds), and arrange them on a canvas in a multi-layer fashion, similar to *Scratch* [100].

The programming and design of *What's Next?* took approximately two months, where a group of three senior researchers with expertise in serious games, social constructionism, and HCI, supervised two graduate students throughout the entire design process. Initially, we discussed how we would "transpose" a SCM study into a gamified environment, and carefully evaluated how such process may impact the nature and scope of SCM. Particularly, we carefully considered how interactive and graphical game elements may be a source of bias to participants. As SCM provides minimal prompts to participants [35, 118, 127], introducing gamified elements may have introduced unintentional biases, which may have impacted narrative structures (e.g., a bird appears in the background –> "Sal sees a bird"). Hence, we kept the game aesthetics and the prompts minimalistic, to reduce these potential biases and balance the free-form nature of SCM vis-à-vis game design. For instance, we balanced indoor and outdoor scenarios to not bias participants towards either, or never showed human characters to let participants speculate on the social status of human-to-human interaction in a post-COVID future. In sum, we designed the game to carefully balance both engaging game aesthetics while staying faithful to the "minimally-biased" nature of a SCM study. We also acknowledge, however, that while we attempted to minimize sources of bias in our game, its aesthetics may still have induced biases in our participants, but do not consider these a potential threat to our qualitative study [94].
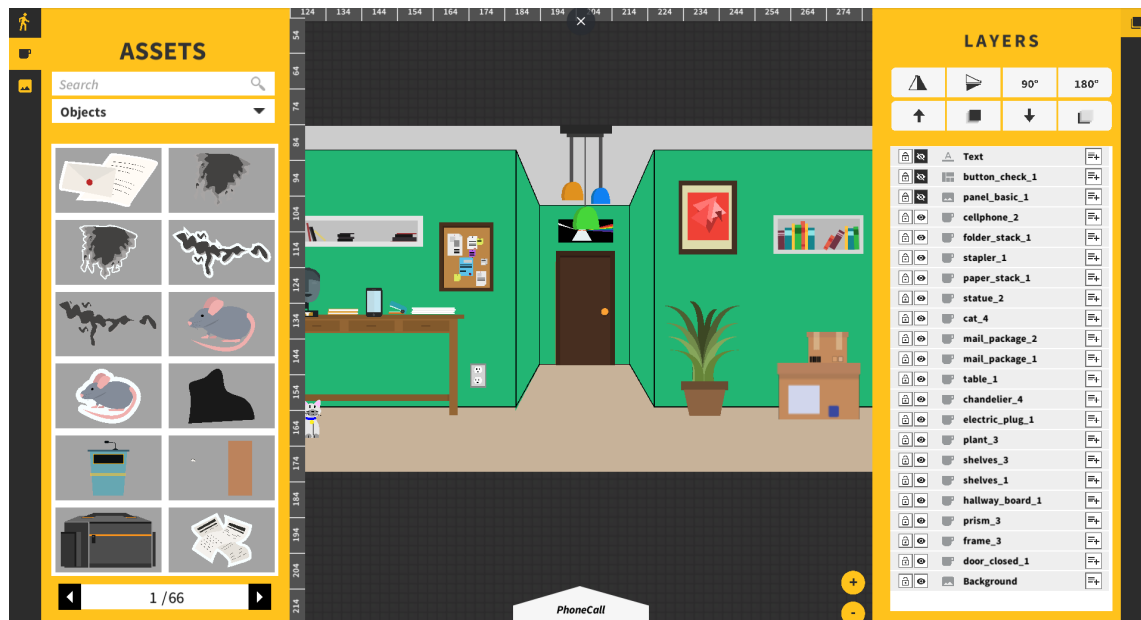

Fig. 3. The *StudyCrafter* layout interface, with two interactive menus to select GUI objects and arrange them by layers, to create multi-layer interactive graphical composites.

3.1.1   1st Iteration. A first version of the game called *Blog Entry 226*, featured a single story completion task (SCT), i.e., writing a speculative story as a blog post from Sal's perspective. Here, the player would act as Sal, who writes a blog post about the current status of society in a post-COVID future. The scope of this first version of the gamified SCM was to minimize all possible biases due to game elements and stay as faithful as possible to the nature of the SCM. However, we found this initial version of the game too close to a "traditional" SCM study and not providing much interactive gaming elements, which one would expect to find in games.

3.1.2   2nd Iteration. We further reflected on how we could introduce more game elements in the structure of our gamified SCM, to render the SCTs and the whole experience more "gamy", while minimizing potentially interfering biases. We started considering the possibility of "splitting up" the underlying question of the game (i.e., what's next after the COVID-19 pandemic?) into multiple story stems or prompts (e.g., [118]), which are contextualized in various scenarios (e.g., Sal sipping coffee at home by the window, Sal receiving a phone call), which scenarios participants can navigate through, as if they were playing an interactive storytelling game (see [115]). However, in our game participants would be allowed to use only text-based input as a mean for interaction. While we kept the graphics of the game minimalistic to reduce biases, some elements of contemporary reality would still be recognizable throughout the game (e.g., a smartphone, a laptop, buildings). As these elements depict technologies and artifacts that are likely to exist in a foreseeable future, we did not deem their presence in the game as a potential threat (or heavy bias) to participants' creative output. We recognize, however, that the "mundane" traits of such technologies may have reflected in participants' stories, where mundanity was already identified as a "commonplace trope" in previous SCM studies [118]. Nevertheless, as we were interested in capturing potential mundane aspect of futures post-COVID, we do not consider this a particular limitation in our study.

3.1.3   Last Iteration, a.k.a. "What's Next?" After approximately two months of work, we finalized the gamified SCM and called it *What's Next?* The final version of the game (see Figure 4 and 5) features in the following order:

(1) A welcome screen explaining the context and scope of the study, followed by a brief tutorial for participants to understand and practice the game mechanics (Figure 4);

(2) Five sequential prompts (or story stems), which constitute the core of the gamified SCM (Figure 5);

(3) An in-game survey collecting the demographics of our participants (e.g., nationality, gender, race/ethnicity);

As said above, the gamified SCM starts with a title screen (Figure 4a), followed by a welcome screen (Figure 4b), explaining to participants the context and purpose of the study; the screen also communicates to participants that their goal in the game will be to *"imagine and speculate about the post-COVID world in which Sal* [the protagonist of the game - Ed.] *lives"*. Notably, the info about the gamified SCM contained in the welcome screen never disclose to participants, (1) what is the year in which this future takes place, and (2) what is the gender identity of Sal, as we left those open to participants' imagination. After the welcome screen, a brief tutorial would follow (Figure 4c), where participants would be instructed by a friendly cat named Smu on (1) how to navigate through the gameplay, and (2) try out a sample SCT; the tutorial was intended as "trial" or "warm up" for participants before engaging with the actual SCTs and could be replayed as needed.

When ready to play the game, the participant could end the tutorial and would then be presented with a black screen, with white text slowly appearing and forming the sentence: *"Sometimes in the future, in a post-COVID world...Sal awakes..."*. Next, the game would positions the participant in the first-person perspective of Sal, who walks close to a window in the living room while sipping coffee, and the following prompt would pop up: *"Sal walks towards the*
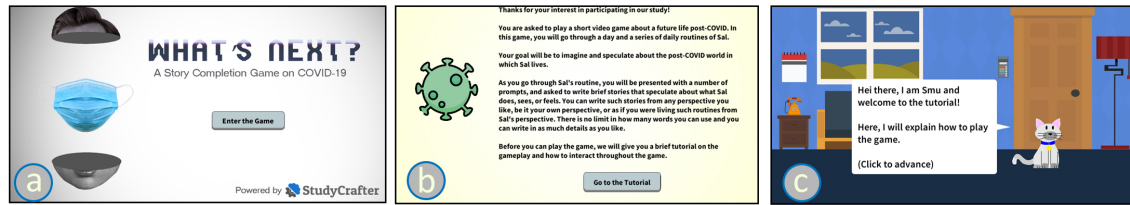
Fig. 4. The first three screens of the game *What's Next?*: (a) the title screen presenting the game to participants; (b) the screen introducing participants to the context and scope of the study; (c) the brief tutorial instructing participants on the game-play and allowing them to try an example of story completion task.

window while sipping a cup of coffee and looks outside...what does Sal see?" (Figure 5a); the prompt would also specify to participants that they could *"write in as much detail"* as they like and *"click the blue checkmark when done"*. Then, the prompt would be followed by a white text-box popping up, where the participant could write their speculations about what Sal sees (or hears, or does); the same sequence of interactive events (i.e., prompt—>pop up text-box) would repeat every time the participant progresses to a newer game scene.

Then, the rest of the day unfolds as Sal receives a phone call (Figure 5b), and a new prompt asks the participant to conjecture upon *"...who called Sal and what is the content of their conversation?"*. After the phone call, Sal goes outside (Figure 5c), and the participant is asked to speculate on *"...why did Sal go out and what does Sal do?"*. While outside, Sal receives a notification on the phone (Figure 5d); here the participant is asked to write the content of such notification, choosing between (1) a Twitter notification, (2) a Trace Together[2] notification, or (3) a notification from an "Unknown App" that the participant could name and describe by themselves. Then, Sal goes back home and writes a Facebook post after dinner (Figure 5e) and the participant receives the last prompt (i.e., *"...what does Sal write?"*).

After the last prompt, the participant is redirected to a thank you screen and asked to take part in a brief demographics survey (Figure 5f). When completed their survey, the participant would be asked to provide retroactive consent (i.e.,

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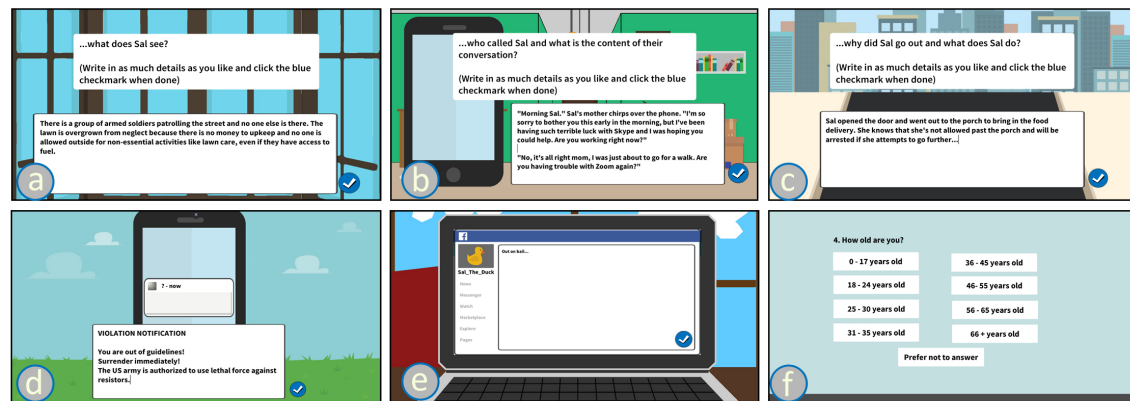[2]https://www.tracetogether.gov.sg/

Fig. 5. The five SCTs and the in-game survey of *What's Next?*: (a) what does Sal see outside the window?; (b) who called Sal (on the phone) and what is their conversation about?; (c) why does Sal go out and what does Sal do?; (d) what App notifies Sal on the smartphone and what is the content of it?; (e) what is the content of Sal's Facebook post?; (f) the survey.

the consent procedure currently set up by *StudyCrater*). We designed the prompts to balance Sal's contemplative (e.g., looking out the window), proactive (e.g., going outdoor), and passive (e.g., receiving a notification) interactions in a future post-COVID. The rationale behind the design of each prompt is exemplified below in Table 2.

Table 1. The five prompts (or SCTs) and their rationale

Prompt	Rationale
1: "Sal walks towards the window while sipping a cup of coffee and looks outside...what does Sal see?"	Aims to unfold participants' visions on how indoor activities are lived and regulated in a post-COVID future
2: "...who called Sal and what is the content of their conversation?"	Aims to unfold participants' vision on the role of ubiquitous computing (see [84]) for verbal communications in a post-COVID future
3: "...why did Sal go out and what does Sal do?"	Aims to unfold participants' visions on how outdoor activities are lived and regulated in a post-COVID future
4: Write the content of a notification on Sal's mobile, choosing between a (1) Twitter notification, (2) Trace Together notification, or (3) notification from an "unknown App"	Aims to unfold participants' vision on the role of ubiquitous computing as notification devices in a post-COVID future
5: "...what does Sal write?" (on their Facebook post - Ed.)	Aims to unfold participants' vision on the role of social media (e.g., [21]) in a post-COVID future

4 METHOD

Similar to research through design approaches [128], we design an artifact (here the game "What's Next?") and use it for research purposes (here performing a gamified SCM study). Specifically, we use this artifact to explore speculative post-COVID futures. Next, we describe the study setup, participant recruitment, and the data analysis procedure.

4.1 Study Setup and Participant Recruitment

We set up a web-page on *studycrafter.com* to run the study (i.e., https://studycrafter.com/project/riddhi/covidscm/) and distributed a promotional flyer with a call for participation (which includes a link to the study web-page) on both social media (e.g., Twitter, Facebook) and webforums (e.g., Reddit). Due to the timeliness of our research topic and the gamified nature of our study, we extended the call for participation to both writers (targeting communities of people who are interested in (fiction) writing similar to previous SCM studies [118, 127]) and a non-writing audience. The two requirements for participation were (1) basic writing in and understanding of English and (2) at least 18 years of age.

The web-page provided participants with contextual information about the study, explaining that the main task consists of playing a "story completion" game, which is articulated around multiple writing prompts (or story stems) that unfold as the game progress. Furthermore, the web-page informed participants that they will be asked to a brief demographic survey at the end of the game; it also clearly informed participants that consent is provided retroactively at the end of the game, and that only by providing consent they will log their play data in our system. No data was collected without consent. Given the sensitive nature of the topic and potentially strong emotional responses to our study, we scrutinized our study setup with the International Review Board (IRB) office, who approved the ethics of our study and deemed it as "minimal risk". If participants agreed with the conditions and scope of the study, they could click on the "participate" button embedded in the web-page and would be then redirected to the gamified SCM.

4.2 Participants

A total of 37 participants completed the gamified SCM study; participation in the study was voluntary. Most participants (57%) were between 25 and 30 years old. Others, were younger (19%) or older (up to 45 years, 24%). 62% of our participants were employed and 19% were students, while 5% preferred not to answer. To survey participants about their gender, we followed the guidelines provided by Spiel et al. [109], and found that 57% participants self-identified as male, 38% as female, and 5% preferred not to disclose their gender. Nationalities varied greatly, with the majority of participants residing in the US (38%), followed by India (16%), while the rest of participants being fragmented in many countries worldwide (e.g., Italy, Denmark, China, UK). Regarding race/ethnicity, the majority identified as White/Caucasian (54%), followed by Asian (35%). The remaining participants chose Middle Eastern or North African or a race/ethnicity not listed. Four participants (11%) considered themselves to have disability while four preferred not to answer. We offered no remuneration for participation, but did provide participants the opportunity to enter a raffle for a $100 gift card. We will refer to our participants as P1 to P37 throughout the rest of the paper. We started recruiting participants at the end of June 2020; P1 played on July 22, 2020, while P37 played on August 25, 2020.

4.3 Data Analysis

We followed earlier work on SCM [23, 34, 54, 78, 118, 127] and analyzed our stories through thematic analysis [33], and mostly through a social constructionist lens. However, we also looked at existing taxonomies that wish to systematically analyze visions and speculations of futures (see [25, 47, 120]; Figure 6), and used those to consider implications of temporal influence on participants' stories, as well as utopian and dystopian perspectives. The thematic analysis took approximately three weeks to be completed. All authors initially discussed the stories as a group to identify potential themes. Then one author with expertise in social constructionism performed a deeper analysis of the stories, which was cross-checked with the other authors intermittently for input. For the last round of analysis, we discussed the consolidated themes in a group to reach consensus on three themes, which we present next.

5 RESULTS

On average, participants completed the gamified SCM in 22.93 minutes (SD = 13.92). In total (excluding the tutorial), participants wrote on average 163 words per story (SD = 119), which is generally less compared to other SCM studies in HCI (i.e., Wood et al. [127] M = 281, SD = 256; Troiano et al. [118], M = 270, SD = 162). However, while Wood [127] and Troiano [118] only used a single story stem and relied on a writers-only audience, we fragmented a core story
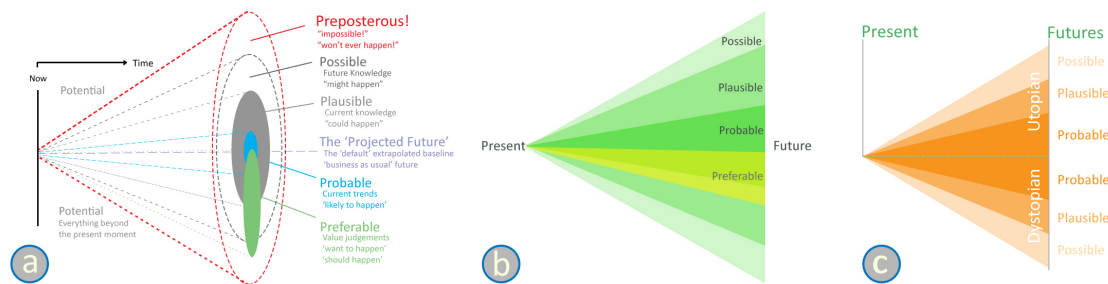

Fig. 6. The three cones for potential futures, re-adapted from (a) the *generic foresight process* by Voros [120], (b) the *taxonomy of futures* by Candy [25], and (c) the *possibility cone* by Dunne and Raby [47].

stem across five prompts and engaged with a wider audience (also non-writers), the combination of which may have yielded more "brevity" in our participants' responses compared to prior work. The first three prompts (i.e., window, phone conversation, and walk) yielded the longest responses (M = 37–41 words, SD = 33–41), while the App prompt the shortest (M = 18 words, SD = 9); the Facebook prompt was somewhat in the middle (M = 28 words, SD = 30).

Table 2. The three themes of meaning making across responses

Theme	Theme Description
Business as Usual	A sense of 'getting back to normal' with COVID sometimes ignored or downplayed, negotiated through a new set of social practices. An adapted world particularly through changed working practices. Digital technology holding a role in maintaining (& automating) normality.
Back to Basics	Couched (somewhat) in uncertainty and hesitancy, a hark back to simpler times, back to nature and necessities. Going back to essential relationships and a socially enhanced world facilitated (in part) by technology.
Everyday Chaos	'End of the world' style narrative, of a broken and recovering world. Although sometimes downplayed the focus is on the 'ruin' COVID has 'left behind'. App notifications and social media playing a role in maintaining this sense of chaos.

The three main narratives through which participants speculated about futures post-COVID were: (1) *business as usual*, where the future is depicted "utopianly" as being "back to normal"; (2) *back to basics*, a future characterized by calmness and a reclaimed connection with nature; (3) *everyday chaos*, a more "dystopian" take on the future, which focuses on issues of totalitarian control and unsettling disruption. A further summary of these themes can be seen in Table 2.

5.1 Business as Usual

The first 'overarching theme' (see [19, 33]) considers how participants' stories were very often framed around a sense of 'getting back to normal', and curiously often was presented as a narrative completely absent of COVID. Despite the study being explicitly framed as around COVID-19 (see Figure 4), many participants ignored the pandemic, or it was imagined that Sal was living so far into the future that COVID-19 was a distant memory:

> "He will see a big green park with colorful plants and trees and small streams. People having picnic and kids playing around" –P37
> "Sal's gated community is quiet today. Across the street he sees his neighbors' houses, cars all still in their driveways, garbage cans out for collection. Besides those, there is little evidence of life in his neighborhood." –P10
> "He sees a few parked cars and a few teens playing around under the tree in a garden in front of his house." –P26

The social depictions present in the responses to the 'window' task: "kids playing around"; "picnics" and "teens playing", suggest a world that has returned to normal, a regular morning without COVID where "everything is normal like before" (P2), the pandemic simply a blip or a forgettable fever dream.

This sense of "normality" was also noteworthy in the App notifications Sal was depicted to receive. Many of these portrayed a world as normal, despite the game prompting that this might be a track and trace application, e.g. "Today is

Mike's birthday. Wish him a Happy Birthday." (P8) "Hey Sal, what's up? Enjoyed yesterday match? WHAT A NIGHT!" (P22), "He opens up the buzzfeed App after a notification of a buzzfeed quiz on what kind of an Onion Sal is (He is a yellow onion)" (P26).

Other stories acknowledged a history of COVID, but emphasised that such a time has passed. The face mask often took on an important role in the stories, as a return to normality was painted as a world without face-masks:

> "Sal goes out because he CAN go out. He is finally mask-less and decides to go to the local coffee shop to get a coffee and drink it in inside the shop." –P27
> "Finally got the enjoy the day outside, walking around with no masks and being able to smile at people. This post-COVID world has made me very excited to explore outside again and be near people." –P32

Both P27 and P32 precede their painted, non-masked world with "finally", a sense of eventually reaching a point where face masks are no longer necessary. The mask was a recurring feature in P27's story and went on to describe "enjoying every bit of the fresh air", where face-masks are seen as implicitly being a hindrance to basic human needs. This reflected the two contrasting understandings of face-masks and how they fit in to 'normality'. P27 and P32 position mask wearing as restricting and inhibiting normality, an inhibitor of 'business as usual'. In contrast, other responses positioned face-masks as an enabler of 'business as usual':

> "Sal sees people jogging and walking while wearing masks. Even people who are mowing their lawn are wearing masks. Some people are walking their dogs and chatting with each other." –P14
> "The road where he lives, all peaceful and chilling and a (masked of course) DHL courier delivering a lot of shippings to the neighbours" –P22
> "Sal sees people on the sidewalk, walking around - but most, if not all, are still wearing masks. People look happy and are going about their daily lives." –P23

In the above, all participants depict everyday social activities, "chatting", a delivery, people "going about their daily lives", a normality enabled through the act of mask wearing. P22 frames this as an inevitably ("of course") indicating a new object to be negotiated in lives carrying on alongside COVID:

> "I see few to no people walking on sidewalks. almost no cars except for the occasional ambulance siren in the distance. COVID has become a part of life in the future and we just accept it." –P13
> "Sal is checking Slack, his workmate post some interesting tech information about the new iPad LIDAR scanner" –P15

A sense of 'quietness' (see 'Back to Basics') was common throughout the stories, as P13 suggests, a 'new normal' with decreased social activity, one that is "just accepted" by the population; a theme that is recurring in current clinical research [99]. This was also reflected in a response from P16 commenting on a delivery person: "most things are delivered these days", suggesting a changed set of practices and norms in a post-COVID future for retailing and delivery of goods (see [102]). P15's response was in relation to Sal going outdoors, suggesting work activities may be conducted 'on the go', and possibly the blurred lines of work and life. Some participants addressed work issues directly: "I am working from home, and my employer gives me calls from time to time for updates on my work, or to assign me new tasks" (P12), "he is grateful about his flexible hours since he can work both at home and at the office as he sees fit" (P20). These responses suggest a world changed but productively adapted to COVID-19 (e.g., [122]).

Digital technology also played an important role in these 'Business as Usual' narratives. This was seen particularly in the 'App notification' portion of the game:

"Someone who recently tested positive for COVID was at the park, if you have not been vacinnated you should leave the park and get tested immediately." –P32

"@nytimes: COVID-19 cases dip below 80,000. Are we now post COVID?" –P10

"Our data has detect that you have been interacted with someone who has COVID-19. Please go to the nearest hospital asap." –P11

"COVID-19 Summary - Automated text There has been (4) new cases in [City Name]" –P19

"Lessons learned from COVID-19. New protocols put into place to effectively handle a pandemic #lesson-learned #postCOVID-19" –P29

The App notifications therefore varied from urgent: "get tested immediately" (P32), to hopeful: "Are we now post COVID?", to solidarity "#lesson-learned". While P11 depicts a scenario recognizable to users to tracing application, P19's response is particularly noteworthy in how it directly acknowledges automation: "automated text", "[City Name]". This suggests a sense of "automating normality" in post-COVID times, where notifications technology are regularly (and automatically) reminding us of this "new normal", characterized by the constant (and latent) presence of COVID in our daily routine as we go about our 'business as usual'.

5.2   Back to Basics

In 'back to basics', participants communicate a narrative around a simpler life that had developed in a post-COVID world, a peaceful and often natured "familiar suburbia" (P7) that in our post-COVID game, Sal initially sees through the window:

"Sal sees his neighbors walking their dog. Usually there are many neighbors out, but he only sees two walking around. The sky is blue and the world is vibrant." –P8

"The streets seem cleaner. Probably from less people being out and littering. Yards and houses are all well kept. Gardens all blooming with vegetables and flowers. People seemed to keep themselves quite busy last year. Many houses look renovated. Overall every looks, prettier." –P36

The world is often depicted to be "quiet", "peaceful" (P15) and "vibrant" (P8), an improved world with "gardens all blooming" (P36) from more attention and people apparently more mindful of the environment. This was also picked up by P9, commenting on "a really nice tended to garden as Sal picked that skill up from quarantine". For P31, "Sal lives in the countryside, so he sees some trees and other flora", with nature often a prominent part of these 'back to basic' narratives. This was particularly pertinent when Sal went outdoors, with participants often drawing on the notion of the 'daily walk':

"Just having a walk in the city park, enjoying alone the green, the peace, the birds singing and the shadows of the trees" –P22

"Sal went for his morning walk. Since he had started working from home he had missed going on his lunchtime walks in the city park, so he had elected to try and find the next best thing. He had sometimes considered going to the park on a weekend, but its proximity to downtown had made that something he avoided." –P10

We again see here vivid descriptors of nature: "the green, the peace, the birds", where 'back to basics' is akin to 'back to nature', time and space to appreciate one's surroundings in a contemplative manner: "On my walk, I wondered - what is the meaning of life?" (P8). P29 depicts Sal "going outside for a run. COVID has really given him a chance

to appreciate going outside and getting some fresh air", indicating the idea of additional space and time afforded by changed social practice which P29 'sums up' in the Facebook post written at the end of Sal's day:

> "Cherishing the small things today: Beautiful weather My best friend (Smur) My health Going to the park Calls from my mom Going for a run Posting on Facebook attitudeofgratitude" –P29

These stories make sense of nature in post-COVID futures as a "medicine" of sort, or a "therapeutic tool" that facilitates a recovery from the COVID-19 pandemic (e.g., [27]). This suggests a return to the simple "small things" (P29) in life. Sal often only leaves the house for basic needs, although there was a range in how this was formulated, from "food for herself and her cat" (P11), "groceries" and "essential items" (P13), to "protein powder for his muscles" (P26) and a "second cup of coffee" (P34). However, for P36 the need to go out for 'basic needs' was also couched in hesitancy:

> "Sal sees that his friend has called to see if they want to go out to get a drink tonight. Sal is hesitant because going out still feels instinctively wrong, but agrees." - P1

> "I take one side of the sidewalk and stay as far away from them as possible. I even try to hold my breath as they get close" - P12

Hence, a 'back to basics' world was also one that had to be carefully negotiated. Sal in P1's story is battling instincts in order to navigate a new social world, and in P12 social contact is navigated with caution. 'Back to basics' was therefore a return to simpler times fulfilling basic human needs, but this was necessarily mediated by vigilance, hence introducing notions of "latent fear", which are now having tangible consequences in real life (e.g., [50]), and that tap into more dystopian visions which we will discuss in our final theme.

Stories also often emphasised a return to 'human connection'. One of the most common (recurring) semantic features of these narratives was in the phone call, where this was very frequently a phone call from Sal's mother:

> "It's Sal's mother, who talks to him regularly to check up on him. COVID-19 really scared her and so now she and Sal have regular chats on the phone. Sal appreciates the calls from his mother so he knows she's alright as well." –P29

The "check-in" 'phone call from Mom' was very prominent across the stories, who is often concerned about sal's "well-being" (P2), a "light" (P23) and "regular" "check-up" (P29). This speaks to gendered notions of the 'good mother ideal'

5.3   Everyday Chaos

When Sal looks out of the window the tone for the story was often set, from a "gated community" (P10, Business as Usual) or "familiar suburbia" (P7, Back to Basics), for a notable minority of participants this task set the scene for a more dystopian narrative:

> "There is a group of armed soldiers patrolling the street, and no one else is there. The lawn is overgrown from neglect because there is no money for upkeep and no one is allowed to go outside for non-essential activities like lawn care even if they have access to fuel." –P6

> "Life has been hard recently. Co-Vid may have passed, but the world was still recovering. Along the street, where once small businesses and shops advertised flashy goods and hot meals, desolate buildings and closed signs now stood" –P17

"Road with jam pack traffic creating pollution and honking for no reason, random [sic] fire breaking out
and firemen cannot reach at the spot. Humans just being mean to each other for the greed of being random
[sic] things." –P25

Only once (P6 in the above) did the story feature a story of a 'police state' and surveillance. We also only saw one 'fantastical' narrative: "Umm so you know how the world is now going through a total shitshow? Yeah I think it is the evil lizardpeope overlords who live underground, who are waiting on their opportunity to pounce and dominate the world" (P26). While these 'end of the world' type narratives was perhaps less prominent than in previous story completion research depicting techno(sexual) futures [118, 127], these narratives of 'everyday chaos' was nevertheless present, depicting a "bleak" (P17), depleted and diminished world. The responses above draw on the visual imagery of "lawn care" and "desolate buildings", while P38 also employs this strategy describing a house with a "ring dangling uselessly as rust had already begun to eat away at it". Here, ideas of social desolateness were at the fore.

Both P17 and P25 also draw, on ideas of economic uncertainty. P9 also does this explicitly, referring to a "huge global recession". While the framing for P6 and P25 in the above is a dissent into chaos and disruption, P17's is one of struggle and (slow) financial recovery. They go on to detail a phone call with Sal's mother (see also 'Business as Usual') which also touches upon this subtle framing:

"Mom: "Hey Sal deary, how are you doing?"
Sal: "Mom, I'm totally fine, what's up?"
Mom: "Well we just finished our little morning walk. Your father talked about politics with the neighbor
for a bit and now we're off to get some groceries. Anything new with you?"
Sal: Nah mom, just the usual stuff
Mom: Oh how lovely. Tell me deary, any new job prospects?
Sal: Not yet. But I'll let you know if anyone decides to finally hire me, don't worry" –P17

Of particular note in the above is the use of "totally fine", a sense of insisting normality even though other elements of the story (i.e., Sal being jobless) would suggest otherwise. Here a potentially large, troublesome scenario of being out of work is underplayed, "the usual stuff", and something not to worry about. P38 also commented on choosing the block he lived in "for no other reason than it was close to work. As he sipped at his coffee, the irony dawned on him that he was now so close to 'work' that he didn't even have to leave the house." Huge economic changes were, therefore, downplayed into something understated and "everyday". Therefore, everyday chaos was less-so about carnage and more about day-to-day disruptions on everyday life:

"@Sal was that you I just saw wandering into the park with a 40oz of Old English? It's only 2pm homie!"
–P7
"Does anyone have any suggestions for alternatives for Uber Eats? There's not a lot of drivers anymore so
it takes foreeeever for any order to get to me." –P10

P10 presents an everyday (and privileged) narrative of waiting for takeaway, which one might consider small and insignificant in the context of a global pandemic, while P7's imagery of daytime drinking potentially hints at the idea of changed habits and (subtly) disruptive behavior. The presentation of these disruptions as 'everyday' came in the ease in which they incorporated into Sal's narrative. These were presented as asides, annoyances, or hassles. There was therefore a role of digital technologies in these stories as delivering chaotic narratives. Once again in the App portion of the game:

> "VIOLATION NOTIFICATION You are out of guidelines. Surrender immediately. The US Army is authorized
> to use lethal force against resistors." –P6
> 'COVID-19 vaccine side effects! WHAT YOU NEED TO KNOW" –P30

While in 'Business as Usual' App notifications were contextualized as a mechanism of returning to normality, P6's response in the above is (literally) arresting, using the language of "violation", "surrender" and "force", while P30 presents a sensationalist 'click-bait' notification on COVID vaccines (a pertinent anticipation of timely discussions about the ongoing infodemic surrounding COVID-19 vaccines [70]). Both communicate a sense of urgency with upper case characters "VIOLATION NOTIFICATION" and "WHAT YOU NEED TO KNOW". To varying degrees, App notifications were presented as disruptive and chaotic.

Longform social media also played a role in these everyday chaos narratives, particularly the 'Facebook Post' task, the last prompt presented to participants. It was notable how often Facebook was underplayed as a platform:

> "Facebook is the most shity platform I have ever used. This is last post. BYEBYE" –P15
> "Nothing, because FB is a waste of time." –P34
> "I should not be using facebook anymore. Does anybody know some more ethical alternatives to social
> media?" –P9

These responses suggest Facebook is becoming notably less favorable, and for at least some holds a certain amount of "cultural baggage" that may not have been there if we chose a different platform to depict in the game. The notion of Facebook posts made light of: "My new preferred gender pronoun is "Zie" please stop saying "he" I will update you tomorrow when that changes again." (P18), or underplayed: "*Insert sarcastic COVID-19 joke here*" (P33), the practice of posting a personal status even criticized in the context of a pandemic: "(Really Sal? Really? How are you still here at your home posting on FB rather than going to a hospital? Sigh...)" (P11).

It was notable that such criticisms were not there for alternative platforms depicted (e.g., Trace Together or Twitter), and that these participants favored criticizing the platform over depicting something to do with the pandemic (Facebook did in fact lose users in 2020, as per [108]). However, when participants did not problematize the notion of writing a Facebook post, they also spoke to the idea of everyday chaos:

> "He are judged in our darkest hour, so lets remember that during such troubling times" –P21
> "Watching the news and everything else makes me realize the world is still realing from the effects of our
> latest pandemic. Poor leadership caused us to suffer; people died; and it felt like the world was burning.
> But I'm here to say we have got this everyone! Just feel the air outside, feel the sun on your sweet kitty
> fur! Sieze the day tomorrow and everyday! I feel good, and I hope I can share that goodness with the rest
> of y'all fine folks!
> PS: If you're hiring, hit me up :)" –P17

In the above, P21 provides a more explicit depiction of chaos, one of darkness and trouble, while P17 emphasises the political dimension of human suffering , with a vivid depiction of a world "burning". However, P17 actively presents a narrative of overcoming the pandemic through positivity. Drawing on notions of back to basics ("feel the air outside, feel the sun"), and a sense of "onwards and upwards", P17 insists upon a business as usual narrative through "siez(ing) the day", possible remedies of such everyday chaos.

6   DISCUSSION

We analyzed 37 speculative stories of post-COVID futures identified from a gamified SCM study. The resulting stories provided three distinct, yet interrelated perspectives of post-COVID futures, which have utopian (i.e., *back to basics*), dystopian (i.e., *everyday chaos*), and "normality" (i.e., *business as usual*) connotations. We discuss how these results reveal an impact of dramatic events like COVID-19 on our perception of the future, thus our capacity to re-envision it; this is particularly relevant to speculative research [15, 47] that wish to foster change and collective reshaping of futures [75]. Furthermore, we discuss implications and lessons learned from extending the SCM [68] via gamification [44].

6.1   What and When is Post-COVID?: Narrative and Methodological Considerations

Deliberate ambiguity is a common tactic in story completion research (see [20]), in finding how participants "fill in the blanks". While our deliberate ambiguity of a "post-COVID" future was meant to give participants freedom in envisioning such a future, it emerged as problematic as their stories mostly struggled with identifying a future, and especially one that differs from the status quo. For instance, we see in participants' stories reference to mandatory vaccinations, results of political elections (i.e., Biden-Harris taking the house, P23), and mask policy that interestingly anticipate real-life events (e.g., Trump being infected with COVID, also P23). However, these (arguably unsurprising) visions rest around a notion of what a "probable" or "plausible" (see Figure 6) post-COVID future may be, but hardly conjectured upon what future is "preferable" or desirable (marginally touched upon in the theme back to basics, yet primarily rooted in notions of past and present). This in turn, reflects how difficult it was for our participants to clearly identify what is meant by "future" when confronted with dramatic events like COVID-19, as well as how far in time this hypothetical post-COVID future may or will be. Consequently, the stories mostly made sense of futures post-COVID as a "persisting present", which Savransky [104] described as the impasse of the present in speculative research:

> "...the future has never been more present, yet the present keeps prolonging itself, insisting, with its own order of continuity, on a time that does not quite seem to pass..." ([104], p. 1).

As such, we ponder "what could have urged?" participants to overcome such an impasse of the present, when the resulting stories clearly evidenced uncertainty and signaled to a potential disruption of knowledge construction in this kind of speculative research, especially in such unparalleled (and dramatic) times (see [1, 107]). While we could have explicitly asked participants to re-envision a post-COVID future that is "different" from the status quo (and acknowledge this methodological choice as a limitation in our study), it is hard to say if the results would have sensibly changed compared to the ones emerging from the present study. Previous SCM studies in HCI, although more consistently framed around a specific socio-technological phenomenon (i.e., VR porn [127], sex robots [118]), bore a core question similar to ours in this study. Yet, the same question produced different results in [118, 127], with speculative narratives that envisioned both possible, desirable, and preposterous futures beyond the impasse of present. For instance, in [118] participants have even identified specific dates for a far future dominated by the sex robots industry:

> "In 2087 they claimed they had made the ultimate product, and they would pair with it the ultimate AI, the mech hivemind." (R22, Male, 29; [118], p. 4)

As this was not the case in the present study, it bears the question of how we could have achieved what Dalsgaard et al. [42] envisioned, i.e. using *"methods such as scenarios, design fictions, and participatory design"* to (propositively) re-envision futures in speculative studies performed during ongoing dramatic events. While we currently do not have a definitive answer to this problem, we encourage researchers to find methodological strategies that can help address the impasse of the present in future speculative studies, especially those studies that take place during ongoing dramatic

events like COVID-19. For instance, as suggested by Coulton et al. [38], consistently referring to Voros's possibility cone [120] in fictional studies may help yield conjectures that are more systematically structured around a notion of what futures are "possible" (or plausible), versus which ones are "desirable" (or preposterous). Contrary to the ambiguous nature of our speculative study, the approach envisioned by Coulton et al. [38] may help researchers engage participants in reflecting on their ("rather fuzzy" [38]) notion of the future beyond the present impasse, by purposely let them contrast visions that both reinforce or challenge the status quo. Furthermore, framing similar future studies more consistently around the notion of "world building" [40] may also help mitigate the influence of present impasse.

6.2 Literary Tropes of Utopia and Dystopia in Speculative Post-COVID Futures

While we evidenced how participants' narratives were inevitably bound up in a fast changing, contextual socio-political landscape, these presented notable "shared narratives" and thematic qualities of how (although ambiguous) the future post-COVID was envisaged, as anticipated in Sections 5. The first theme was characterized by (1) a "new normality" (see Section 5.1), were we learn to cope with COVID through acceptance (i.e., the last "stage of grief" [81]), (2) a will to reconnect with nature (see Section 5.2), in an attempt to "exorcise" the poignant vibe brought by the COVID-19 pandemic and (3) elements of conspiracy theory [77] (see Section 5.3), for a future society ruled by totalitarianism and coercive power [67]. These visions tap into problematic discourses grounded in literary tropes from fiction, which also reflect principles from mainstream psychology. For instance, the dystopian views in *everyday chaos* evidenced a sort of shared "apprehension" for a future post-COVID that might just end up being shaped by technological totalitarianism (see [74]), characterized by constant monitoring and control like in Orwell's envisioned dark futures [96]:

> "A recording says 'Your location has been logged and verified by infrared scanning. Thank you for complying with regulations. We will be delivering food later today subject to continued compliance.' Then the recording hangs up" –P1

By contrast, the narrative of *back to basics* propounds a vision of a post-COVID future where humanity has "learned the lesson", touching upon a Jungian's perspective of "going back to nature" to find the "roots-soul" (e.g.,[76]) of humanity, drawing an apparent disconnect between (human) nature associated with the pandemic and massive use of technology. The occurring narrative event of the phone call from Sal's mother speaks to primal ideals of human connection and social bonding (e.g., [83]). These visions that spring from participants' stories introduce perspectives and speculations (all of which may or may not contribute to form a shared understanding and narrative [8, 104]) of a post-COVID future. Like the stories generated from more classic story completion research [118, 127], the stories generated from the game should be understood as speaking to dominant cultural narratives, which in this case fell on a spectrum from complete normality (*business as usual*) and reconnecting with nature (*back to basics*) to something akin to the "end of the world" (*everyday chaos*). The positive visions of returning to a calm, harmonized, and nature-immersive post-COVID future (i.e., back to basics), may be identified as utopian narratives that "willingly construct a disblief" [57] in a future world where we must coexist with COVID. Contrarily, the narrative of everyday chaos envisions a future that we may regard as preposterous, but which participants also saw as plausibly rationalized in sense of distrust for fair uses of ubiquitous computing technologies by future governments [55], or the fear of being spied on [3]. Here, both literary tropes of dystopia [30] and elements of reality converge in participants' narratives. The narrative of business as usual instead seems based on a passive acceptance of the "default extrapolated baseline" [120], which (as said above) perpetually projects the current status quo [104] into a hypothetical post-COVID future (i.e., the present "is" the future), and may be seen also as a form of coping mechanism [92] that people vented and leveraged to construct their narratives. In short,

based on these observations we see further opportunity for studies concerned with speculative narratives to further reflect on how literary tropes and dominating cultural narratives impact visions and socially-constructed narratives.

6.3 Opportunities and Challenges of Gamifying SCM Studies

Story completion research is a relatively new form of qualitative data collection, and many researchers have identified opportunities here for methodological innovation [20], for example by incorporating visual elements as supplements to the main story completion task [68]. Our research takes this considerably further. While story completion research typically asks participants to respond to one prompt, or in some cases several, here participants were invited to complete five gamified writing prompts. This has implications for story completion research, particularly for its use in HCI.

Our study design allowed us to explore participants' responses to a range of gamified prompts (i.e., story stems). These were sometimes unexpected. For example, the Facebook post prompt often resulted in affronted responses from participants. If this was our only prompt, this may have hindered our data collection. However, because it sat within a suite of prompts we were able to explore this issue as part of the broader landscape of responses. Likewise, the phone-call prompt resulted in responses that emphasized human connection and the smartphone notification gave insight into how digital technology spoke to our themes of meaning making. Therefore, this gamified version of the story completion arguably gave us more breadth in our responses, but also the ability to provide a targeted focus on a specific aspects we wanted to focus on. For example, as HCI researchers, it was important for us to consider how digital technology fit within a post-COVID future and we were able to design a prompt specifically around this (i.e., the App notification). We suggest that this method could be useful to researchers concerned with the inclusivity of future technology [80], as they could use it to set up gamified SCM studies and gather insight about social constructions of technology in relation to the broader socio-cultural and temporal context (here COVID-19 pandemic).

Our prompts were structured to give a storied sense of flow. The first prompt around looking out of the window (i.e., prompt 1) was perhaps the most open and non-directive of the prompts, but nevertheless provided an underpinning for the three themes that we identified. The order of prompts from 2 to 4 implied a sequence of events, which allowed a more restrictive narrative to play out, resulting in commonplace tropes such as the daily walk or a phone call from Mom. The last prompt of writing a Facebook post (i.e., prompt 5), similar to prompt 1, held a sort of "summative" role in identifying overarching narratives across the dataset. Braun and Clarke [19] suggest that story completion researchers might look for *vertical* patterns in stories to distinguish the progression of the stories, which they suggest might lightly capture conventions around storytelling and genres. Future research could consider further the interplay between the researcher driven framework for progression and participants' storied narratives.

While traditional story completion is also helpful in exploratory studies of little researched topics [118, 127], gamified story completion allows the researcher to deploy a whole host of prompts to see what is pertinent and taken up by participants. Moreover, although there are implications around story length (see below), the number and structure of responses meant shorter stories were easier to categorise than in previous research utilizing story completion—it was fairly straightforward to identify brief stories adhering to business as usual, for example. Overall, we found the gamified SCM an interesting methodological exploration, which has promise to bring different insights and new opportunities for interpretations around story completion data.

From a gamified research perspective, the current work contributes by showcasing another research method (i.e., SCM) that can be gamified and one that is focused on extracting qualitative insights, which is quite uncommon compared to most efforts that focus on quantitative game analytics [49]. To our knowledge, only one such prior example exists, which focused on gamifying the 'Thematic Apperception Test' (TAT) [51]. Interestingly, Borna et al. found *longer*

stories by participants compared to a more traditional study setting. In contrast, our work shows relatively shorter stories compared to other SCM studies, despite including more prompts. Thus, more work is needed to examine and understand how gamification of research methods impacts the data collection.

While creating the initial gamified SCM was relatively straightforward with StudyCrafter, it took the research team two months of iteration to feel satisfied with the final product. This was because we felt the gamified SCM was never "gamy" enough; however, to avoid introducing biases we were at the same time limited in our freedom to design engaging gameplay. Validity threats are a major concern in gamified research [58] and to that end, in exploring the possibility of gamifying speculative studies it was mentioned that "limiting the playability of the game might be a desired quality of the game" [37]. For instance, in our game we had two outdoor scenarios: (1) an urban street in a city (Figure 5c) and (2) a park (Figure 5d). We find that stories of everyday chaos emphasized the urban scenario with "armed soldiers patrolling the streets" (P6), while stories of back to basics emphasized the green scenario provided by the park and "Going for a run Posting on Facebook attitudeofgratitude" (P29). While the participants writing these stories may have had any reason to write them as such, we see how a simple background may have already generated biases and acknowledge this as a potential limitation of our proposed method. On the other hand, perhaps we did not go far enough with enticing players to explore this topic through play (see Gaver [56] on designing for Homo Ludens). Hence, we suggest that researchers interested in replicating (or extending) our study, continue experimenting to identify potential design trade-offs that well-balance gamification vis-à-vis social constructionist research.

7 CONCLUSION

We performed a gamified SCM study to explore views and perspectives on futures post-COVID. We did so by leveraging gamification tools for research (i.e., *StudyCrafter*), inviting 37 participants to "play" a day in the life of Sal, and let them conjecture about post-COVID futures. Through thematic analysis, we unfolded narratives of *business as usual* (i.e., an almost immutable future), *back to basics* (i.e., a positive, utopian take on a post-COVID future), and *everyday chaos* (i.e., a dyspotian post-COVID future of totalitarianism deployed through technocracy). Results also show that it was hard for participants to conceptualize a notion of "future" because limited by the impasse of present events (i.e., COVID-19), with visions of present and future often overlapping and blending into one another. For this, we recommended that speculative research methodologically consider (and tackle) these temporal and contextual limitations in future studies. Furthermore, we provided methodological considerations on gamifying qualitative research methods that leverage social constructionism, particularly the SCM. We hope that our work will generate vibrant discussions among communities of researchers who are interested in (1) understanding socio-technological futures from a speculative perspective and (2) methodologically extend SCM and gamified research.

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