

AperTO - Archivio Istituzionale Open Access dell'Università di Torino

Playing during a crisis: The impact of commercial video games on the reconfiguration of people's life during the COVID-19 pandemic

This is the author's manuscript

Original Citation:

Availability:

This version is available <http://hdl.handle.net/2318/1854681> since 2024-09-21T13:52:21Z

Published version:

DOI:10.1080/07370024.2022.2050725

Terms of use:

Open Access

Anyone can freely access the full text of works made available as "Open Access". Works made available under a Creative Commons license can be used according to the terms and conditions of said license. Use of all other works requires consent of the right holder (author or publisher) if not exempted from copyright protection by the applicable law.

(Article begins on next page)

Playing during a crisis: The impact of commercial video games on the reconfiguration of people's life during the COVID-19 pandemic

Authors: Arianna Boldi¹, Amon Rapp², Maurizio Tirassa¹

Affiliation: ¹ *University of Torino, Psychology Department, Torino, Italy*

² *University of Torino, Computer Science Department, Torino, Italy*

Abstract. The COVID-19 pandemic led to dramatic changes in people's lives. The Human-Computer Interaction (HCI) community widely investigated technology use during crises. However, commercial video games received minor attention. In this article, we describe how video game play impacted the life transformations engendered by the pandemic. We administered a qualitative online survey to 330 video game players who were living in Italy during the lockdown measures. We found that the COVID-19 pandemic altered the participants' sense of time and space, reshaped both their intimate and wider social interactions, and elicited a wide spectrum of disturbing emotions. Players escaped from this unsatisfying reality into video game worlds, searching for a new normality that could compensate for the unpredictability and dangerousness of the pandemic life, as well as seeking uncertainty in the game environments to balance the flatness of the lockdown everydayness. In doing so, they "appropriated" the gaming technologies, which also led to several unexpected outcomes. Starting from these findings, we propose a model of escapism that points out four ways to escape from reality into video game worlds. Moreover, we outline some design implications that might inspire future strands of research in the field of crisis technologies.

Keywords: pandemic, COVID-19, crisis, video games, playing, HCI, escapism, mental wellbeing, mental health, crisis informatics

Contact Author: Arianna Boldi - University of Torino - Psychology Department – Via Verdi 10, 10124 Torino, Italy - Mail: arianna.boldi@unito.it

To cite this article: Arianna Boldi, Amon Rapp & Maurizio Tirassa (2022): Playing during a crisis: The impact of commercial video games on the reconfiguration of people's life during the COVID-19 pandemic, *Human-Computer Interaction*, DOI: 10.1080/07370024.2022.2050725

This is the Accepted Manuscript of an article published by Taylor & Francis in *Human-Computer Interaction* on 2022, available online: <https://www.tandfonline.com/doi/full/10.1080/07370024.2022.2050725>

1 INTRODUCTION

Despite the development of a variety of vaccines for COVID-19 and the administration of billions of doses across dozens of countries, the world is still facing a public health crisis that is unprecedented in the contemporary era. Since its first clinical, epidemiological and microbiological identification, which took place between December 2019 and January 2020 in the People's Republic of China (Wu et al., 2020), the disease has rapidly spread, crossing geographical borders (Chun et al., 2020). Clinical manifestations of COVID-19, when present, are heterogeneous, ranging from mild flu-like symptoms to a severe respiratory and/or multiorgan failure syndrome which may be fatal (Rodriguez-Morales et al., 2020). Asymptomatic individuals or those in the early stages of the disease can be contagious (WHO, 2020), so that many countries adopted containment strategies such as social distancing, mandatory sanitary measures (e.g., wearing surgical masks), and mass testing, even enforcing lockdowns of every social activity and limiting the personal freedom (Kraaijeveld, 2020) during the peaks of the pandemic (Fazeli et al., 2020).

Italy was affected early by COVID-19, being considered the epicentre of the European outbreak (Schnirring, 2020). The Italian government imposed an extremely strict lockdown on the whole country from 8 March to 3 May 2020 (Government, 2020). Many industrial and most commercial activities were suspended, while sporting, recreational and restaurant businesses were straightforwardly shut down; online teaching was enforced in schools of every order and degree and in universities, and remote working became mandatory in every context where the worker's physical presence was not considered essential, as in logistics or medical services. People had to remain at home except for satisfying basic needs like buying food, whereas both infected people and their strict contacts were forced to stay in complete isolation (Iorio et al., 2020).

In this scenario, digital technologies appeared to offer a relief. They allowed individuals to work, learn and communicate from a distance, substituting for the loss of physical contact and social life in the "real" world. Bastoni et al. (2021) emphasized that during the pandemic people living in Italy relied even more on digital communication tools to maintain social connection in a safe way, as well as to ward off feelings of loneliness, anger, and irritability (Gabbadini et al., 2020).

By and large, technology has been shown to help in many "crises" (e.g., Qu et al., 2009; Kannan et al., 2019), enabling people to deal with some of their negative impacts. In this perspective, the Human-Computer

Interaction (HCI) community has researched how digital technologies are used by people affected by natural and man-made disasters, as well as how novel devices can be designed to support both citizens and formal responders in managing the consequences of crises. To this aim, commercial video games are certainly relevant, because they represent an immediately available resource when people have to cope with the negative consequences of a crisis, also given their increasing popularity among the general population (Williams, 2006; Juul, 2009) and the fact that the number of video gamers across the world is expected to rise to 3.07 billion by 2023 (Clement, 2021). However, this kind of games has received scarce attention in previous work on technology and crises, which has focused more on the design of novel games with a serious purpose (e.g., Chittaro & Buttussi, 2015). Recently, some research has paid attention to commercial video game usage during the COVID-19 crisis. On the one hand, psychology scholars studied the evolution and possible worsening of gaming disorders (Fazeli et al., 2020; Hall et al., 2021; King et al., 2020; Ko & Yen, 2020), or hypothesized that certain games may promote individuals' wellbeing (e.g., Viana & De Lira, 2020). However, the hypotheses about the positive role of video games were not put to test through empirical studies. On the other hand, HCI researchers mainly designed novel digital games specifically addressed to support social connection and stress management (Haqq & McCrickard, 2020; Ji & Nishino, 2020).

These contributions are certainly valuable in showing the possible dark sides of gaming technologies from a psychological perspective or in building novel "gameful" tools for managing the impact of a pandemic. Our aim instead was to explore how commercial video games are entangled in people's activities and the wider role they may have during a public health crisis. These video games have been shown to provide players with real-world benefits (e.g., Granic et al., 2014). Research has also emphasized that they may give people help during difficult personal life experiences, especially on the emotional and social levels (Iacovides & Mekler, 2019). Therefore, it is reasonable to hypothesize that they may also be helpful during a collective crisis.

Commercial video games are deeply intertwined with the players' everyday practices (Muriel & Crawford, 2018), so that they can be a significant indicator for understanding collective phenomena like crises: these events may affect or even disrupt such practices (Brand, 2010) thus provoking a reconfiguration of the ways of playing. In these complex transformations, video games may become a helpful resource to deal with the negative consequences of the changes induced by the crisis.

In this article, we want to precisely explore the role that commercial video games played during the Italian COVID-19 lockdown, which may be emblematic of the pandemic crisis, given the strictness of the Italian measures to contain the virus. To this aim, we asked 330 video game players to report on their experience of play using a qualitative online survey with open-ended questions. Since we conducted our study in real time, during the actual months of lockdown, the answers and the considerations that the participants offered were those that they explored in the actual unfolding of the events. This research is important because it shows how people may find in the technologies that they already have at their disposal a ready-to-use tool to cope with the impact of a health disaster. Moreover, it may provide useful insights on how to design novel ad hoc technologies for helping people during the spread of a contagious disease.

In sum, we attempted to answer two different research questions: How were commercial video games used during the pandemic and how did they impact the life transformations engendered by the crisis? What kinds of suggestions can be drawn to design novel technologies for crises?

Our contribution to the HCI community is twofold. First, we describe the complex interplay between video games and people's everyday practices and experiences, highlighting that video games allowed players to escape from the crisis temporally, emotionally, socially, and spatially. These findings may advance our knowledge on the positive impacts of video games during crises or difficult life moments and might possibly be generalized to all the situations that yield a sudden change in people's lives, disrupting their daily routines and increasing the unpredictability of the everyday life, or establishing an extremely "certain" and unvarying lifestyle. Moreover, these study findings may widen our understanding of how players may "escape" from unsatisfying aspects of their everydayness into video game worlds. Second, we show that people are able to "appropriate" a given technology to deal with unexpected critical events, adapting the malleability of video games to the needs arising from a novel world. This may contribute to research on technology and crises by emphasizing that a ready-to-use and widespread technology like commercial video games can be effectively employed by people to autonomously cope with the negative consequences of a crisis.

The article is structured as follows. Section 2 provides a picture of previous research related to technology and crises. Section 3 outlines the method we used, whereas Section 4 describes the findings of our study. Section 5 discusses the results introducing themes relevant for the management of crises through technology. Finally, Section 6 proposes a series of suggestions for design, while Section 7 concludes the article.

2. BACKGROUND

2.1 Technology and crisis

The employment of digital technologies in the context of man-made and natural disasters has a long history. Initially, it was confined to authorities and organizations involved in crisis management (Stephenson et al., 1997). However, in the last twenty years, research on disaster management has widened its focus, leading to the creation of an interdisciplinary body of work called *crisis informatics* (Hagar, 2006). These works take into account informational, technical and social aspects of emergencies (Hagar, 2010), even exploring practices where Information and Communication Technologies (ICTs) are used by the general public in response to crises.

Similarly, HCI has contributed to the study of technology during catastrophic events by first focusing on how existing technologies may support practitioners (Kristensen et al., 2006; Hellman et al., 2016), the so-called digital volunteers (Cobb et al., 2014; Dittus et al., 2016), and authorities (Goggins et al., 2012; Alcaininho et al., 2017) before, during and after an emergency (Reuter et al., 2017; Hughes et al., 2014; Deneff et al., 2013; St. Denis et al., 2012).

More recently, the HCI community has paid more attention to the involvement of the general public in emergencies (e.g., Gui et al., 2018; Palen et al., 2010), by studying their response to the crisis and their usage of technology to gather or spread information (Qu et al., 2011; Vieweg et al., 2008), self-coordinate (Qu et al., 2009), re-establish connections with others (Mark et al., 2009), or support recovery from the event (Semaan & Mark, 2012). In particular, social media have been considered an ideal lens to explore how people cope with a crisis (De Choudhury et al., 2014), as they enable individuals to generate, distribute, and discuss information (Starbird & Palen, 2011). Even during an epidemic, they can be used to e.g., understand how a contagious disease is spreading (Kogan et al., 2015; Goolsby, 2010; Gomide et al., 2011), obtain information on the disease (Kannan et al., 2019; Shahid et al., 2020; Pine et al., 2021), take decisions (Gui et al., 2017), or self-disclose during moments of distress (Zhang et al., 2021).

Although less explored than social media by the HCI community, video games also appear to play a relevant role in affecting or informing about the evolution of a crisis. In fact, HCI researchers mostly designed and developed ad-hoc “serious” video games to e.g., support the staff that is institutionally involved in an

emergency intervention (e.g., Estrada et al., 2017; Stiso et al., 2015; LaLone et al., 2019; Wuertz et al., 2018), train formal responders (Alharthi et al., 2017; Toups et al., 2015; Aldunate et al., 2019; Herrera et al., 2014; Sharma et al., 2017; Warmelink et al., 2017), educate citizens about crises (Shohieb, 2018; Gampell et al., 2020b; Kafai, 2008; Tsai et al., 2015; Seddighi et al., 2020; Sanders & Rhodes, 2007), or improve their ability to act properly in specific emergency contexts (Chittaro & Buttussi, 2015; Gampell et al., 2020a; Chittaro & Sioni, 2015). By building a culture of resilience (Caroca et al., 2016), these games aim to protect individuals from threats to their physical and mental health (Sudarmilah et al., 2019). For example, if not adequately shielded during and after a disaster, people may develop a Post-Traumatic Stress Disorder (PTSD): under such circumstances, gaming technologies may be a resource to treat their mental condition (Saltzman et al., 2017).

In sum, previous HCI literature has recognized technology as a resource for dealing with crises mainly focusing on social media platforms. In the area of video games, instead, research has focused mostly on ad-hoc “serious” designs, while the role of ready-to-use commercial video games has remained unexplored. However, the positive impacts of video games have been studied in other domains than crisis management, which may yield insights for exploring their role during a health crisis. In this sense, inspiration may come from research that investigated how games are used by people experiencing difficult life moments.

2.2 Positive impacts of video games

The benefits of play have been studied for decades. Johan Huizinga’s (1938) seminal work describes play as a free and meaningful activity that is central in flourishing societies and plays an important role in the formation of culture. Roger Caillois (1962) followed Huizinga in emphasizing the central role of play in human societies. More recently, it has been noticed that video games have shaped the digital culture that characterizes our contemporary world, deeply affecting how we work, learn, and relate with others (Muriel & Crawford, 2018).

Beyond the societal and cultural impacts, video games have been also shown to positively affect individuals’ physical (Bonnechère et al., 2016) and mental health (Boldi & Rapp, 2021), as well as general wellbeing (Granic et al., 2014; Tyack et al., 2020). Developmental psychology has long emphasized that play allows

children to simulate alternative emotional consequences (Erikson, 1977), reproduce real-life conflicts, and work out ideal resolutions (Piaget, 1951), which can have an impact even outside the play context. Gottman (1986), for instance, showed that children use play for emotional mastery in their real lives, while Granic et al. (2014) stressed that video games provide players with real-world cognitive, emotional, motivational, and social benefits, like the opportunity to acquire important prosocial skills, improve their own mood, cultivate an optimistic motivational style, and enhance creativity. Within HCI, research suggested that video games may constitute a meaningful activity (Mekler & Hornbæk, 2019): players may reflect on gameplay and how it relates to their personal everyday life, thus supporting sense-making processes (De Schutter & Vanden Abeele, 2012; Bopp et al., 2016; Rapp, 2018; Zhang et al., 2020).

Given these general benefits of play, it comes as no surprise that video games have also been found to provide people with help during unsatisfactory life periods or difficult life experiences (Iacovides & Mekler, 2019). More precisely, research has highlighted that in these contexts playing video games may mostly give players an emotional and social support.

With reference to emotions, several studies emphasized the generally positive emotional impacts of video games, while others have focused on gaming as a means to deal with specific negative emotions. For instance, Reinecke et al. (2012) found that games may provide relief from frustration, while Bowman & Tamborini (2015) suggested that stressed individuals may experience mood repair by playing video games. Likewise, Collins and Cox (2013) highlighted that digital games may be utilized to improve post-work recovery and reduce work-related stress, while Russoniello et al. (2013) found that playing video games can facilitate a decrease in depression in both the short and the long term.

As regards social relations, research pointed out how video games may strengthen family bonds (Durkin & Barber, 2002), as well as provide a complementary function to offline non-game relationships (Vella et al., 2016). Moreover, Banks & Cole (2016) surveyed US military and veteran gamers regarding their use of digital games, finding that they were used to cope with the challenges of military service, giving players the opportunity to connect with civilians as well as to find support from other military personnel. Iacovides & Mekler (2019) further stressed that playing games may help people feel less alone and give them a sense of belonging in times when they may feel isolated. Video games also appear to be able to provide a welcome respite from emotional distress and negative thought processes.

Other kinds of benefits provided by games when used during difficult life moments have been far less studied. An exception is Semaan et al.'s (2016) investigation into veterans' use of ICTs during civilian re-integration, briefly mention that some veterans played multi-player mission-style games online, like World of Warcraft or Call of Duty, to reconnect with former soldiers and run 'missions' that could maintain familiar aspects of their life in the military, thus granting a return to their past life. However, studies exploring potential usage of video games for temporally or spatially retreating from the world are extremely scarce. Moreover, there is a lack of research attempting to provide a multifaceted depiction of the multiple ways through which people may possibly deal with an extremely difficult life moment by finding refuge into the game worlds.

In sum, these studies point out how video games may be able to affect people's wellbeing by influencing their emotions and supporting their social interactions. However, other kinds of benefits of video games, like "spatial" and "temporal" ones, are still underexplored by this research, and there are still very few studies on the use of commercial video games as part of a player's attempt to cope with extremely difficult life moments, as those happening during a collective crisis. Moreover, there have been limited efforts in providing explanations of the phenomena underlying such positive benefits. While most of the studies we reviewed in this subsection suggest that during difficult life situations video games can influence people's general wellbeing through providing a sort of escape, there appears to be little investigation into the possible importance of "escapism" and the different ways in which it may unfold. Escapism is a term generally used to indicate an avoidance of the "real" (Evans, 2001; Calleja, 2010) and is mostly conceived as a unitary phenomenon (Warmelink et al., 2009) often with a negative connotation (Blasi et al., 2019; Deleuze et al., 2019; Kwon et al., 2011; Liu & Chang, 2016; Snodgrass et al., 2014). A minority of studies, however, highlighted that escaping in video games can also lead to positive outcomes, like enjoyment and stress-relief (Kardefelt-Winther, 2014; Hussain et al., 2021).

In this article, we explore the multiple strategies that commercial video games may offer to deal with a life-threatening global health crisis, highlighting the emotional, social, temporal, and spatial benefits of playing, thus also investigating opportunities, like the spatial and temporal ones, which received almost no attention in previous research on games during difficult life experiences. In so doing, we trace back these strategies to an underlying "escapism" that people may enact to run away from a dissatisfying reality, emphasizing the

multifaceted nature of the phenomenon and its positive effects in the context of crises. Before heading into the details of the study, however, we will illustrate the peculiarities of the COVID-19 crisis.

2.3 Technology, video games and COVID-19

The coronavirus pandemic brought a dramatic change in areas as diverse as education (Sabie et al., 2020; Shichtman, 2020; Beltran-Sanchez et al., 2020), economics (Marino & Pariso, 2020; Nicola et al., 2020), technology usage (Chun et al., 2020; Pahayahay & Khalili-Mahani, 2020), health (Gabbiadini et al., 2020; Spinelli et al., 2020), social relationships (Balanzá-Martínez et al., 2020), and work (Thakkar et al., 2020).

In Italy, people who happened to be far from their home at the moment of the lockdown were precluded from returning there, while the others were confined to their own households. Most citizens started working from home or became unemployed (temporarily or permanently) due to the closure of many commercial and industrial activities. Schools and universities were moved to remote teaching. Social life was suspended: leaving the house was forbidden except to those whose physical presence at work was necessary or for the time and distance needed to satisfy basic needs like buying food, and people could not meet their friends or significant others living in other households (Iorio et al., 2020). All these measures drastically altered people's day-to-day life and habits (e.g., Amerio et al., 2021a; Prete et al., 2021; Di Renzo et al., 2020) and brought consequences on their wellness and mental health (e.g., Gualano et al., 2020; Amerio et al., 2021b).

Of course, natural calamities and man-made disasters have always burdened mankind (Kendall-Tackett, 2020); yet many researchers agree on the uniqueness of the COVID-19 crisis and on the role that digital technologies played in it (e.g., Niu et al., 2021; Pine et al., 2021): the disease spread in an extremely interconnected world (Wallace, 2020) where ICTs are widely accessible (Durodié, 2020; López-Cabarcos et al., 2020; Gabbiadini et al., 2020). Also the gaming technologies had already widely been accepted by the general population at the time of the outbreak, seeping into many aspects of everyday life (Muriel & Crawford, 2018). It comes as no surprise, therefore, that video games could play a significant role during the pandemic. The "stay-at-home" mandate also encouraged people to engage in online gaming: during the various lockdowns that were enforced across the world, the gaming industry launched a social media campaign (#PlayApartTogether) and, notably, even the World Health Organization (WHO) fostered video

game playing (King et al., 2020). As a matter of fact, global video game sales increased during the lockdowns (Broughton, 2020; Zhu, 2020).

Scholarly studies and technical reports quantitatively showed modifications of gaming habits during the pandemic, also highlighting an increase of the player population (Wannigamage et al., 2020) as well as of the time spent on video games (Pantling, 2020) and on streaming platforms (Stephen, 2020). However, only a minor quota of the academic research revolving around technology usage during the COVID-19 outbreak (e.g., Chun et al., 2020; Dey et al., 2020; Riva et al., 2020) focused on video games. Most of this research adopted a “medical” lens, where exergames were used for rehabilitation purposes (Ambrosino et al., 2020; Colley et al., 2020). Psychological research mostly focused on the possible negative outcomes of gaming, which may even result in gaming disorders (King et al., 2020; Ko & Yen, 2020), while positive effects of commercial video game playing have often been hypothesized but not empirically tested (Viana & De Lira, 2020; Zhu, 2020).

Within HCI, in line with previous research on video game and crises, particular attention has been devoted to the development of ad hoc designed video games, thought of as a good way to cope with stress and to maintain social bonds during the pandemic: Haqq & McCrickard (2020) designed a game that enables partners to play together while apart; likewise, Ji & Nishino (2020) developed a “healing game”, whose objective is to elicit a calm, relaxed emotional state. Researchers also studied how specific kinds of games have been adapted to the new conditions engendered by COVID-19. Yuan et al. (2021) noticed that people playing tabletop games set up new communicative spaces for gaming as well as socializing: however, this study focused on changes of the experience of play but did not explore how such changes interacted with the life changes induced by the pandemic.

In this article, we aim to investigate the use of commercial video games during the pandemic to understand how they possibly interacted with the ongoing transformations in the players’ everyday practices and experiences. We point out that games brought beneficial effects to players responding to their fundamental desire to escape from negative changes in their everyday life. Moreover, we stress how players were able to “appropriate” video games, using off-the-shelf technologies to deal with an unexpected novel situation. This may be particularly relevant because commercial video games are a widespread and ready-to-use

technological resource, which people may have already integrated into their daily routines and use for facing the consequences of the crisis, thus not requiring the development of any further design.

In the following we explore how 330 players used common commercial video games during the pandemic lockdown in Italy. In doing so, we adopt a HCI lens that goes beyond the psychological impacts of playing, instead unraveling the complex interactions between technology and the profound transformations that people lived in their everyday practices and experiences during the COVID-19 crisis.

It is worth noticing that from now on we will use the word “crisis” to refer to both the global public health emergency engendered by the virus and the measures that were implemented to contain its spread, namely the lockdown. We assume that in the people’s experience these measures were profoundly tied to the biological phenomenon of the disease, actually representing the peculiarity of this health emergency. In this perspective, we temporally circumscribed our research to the period in which the first lockdown occurred in Italy: this was the strictest lockdown that Italian citizens experienced during the pandemic years and one of the strictest in the world. In this sense, it may represent an emblematic case to study how the COVID-19 disaster affected the individuals’ daily living.

3 METHOD

To better understand how video games were used during the Italian lockdown and how they impacted people’s everyday life, we conducted a qualitative online survey with video game players. As we were interested in players’ experiences and accounts, we administered mainly open-ended questions. The three authors who conducted the study have the following background. The first author is a psychologist and psychology researcher who has a background in both clinical and organizational psychology with an interest in human-computer interaction; the second author is a human-computer interaction researcher who has a background in computer science, social, and anthropological sciences with a focus on qualitative research; the third author is a psychology researcher with a background in cognitive sciences and organizational and work psychology. The first and the second authors have also an interest in video games.

3.1 Procedure

Data were collected with an online questionnaire hosted in a dedicated survey platform provided by our University: the survey was active for one month, namely from one month after the beginning of the lockdown (1 April 2020) to the day when the strictest measures were lifted (3 May 2020). The survey was launched when the lockdown had already become part of people's new normal and most of the responses were collected during the first two weeks of the survey (70.6%, N=233). People did not learn that the lockdown would be eased until one week before it happened, on 3 May, and in that week only 11 individuals participated to the study. Despite possible slight changes in the perception of these latter participants due to the hope of a gradual regaining of freedom (which, by the way, was almost fully reacquired only on 11 June 2020), we did not observe any relevant evolution among the submitted responses.

We recruited participants from several forums dedicated to video games, namely Everyeye (<https://forum.everyeye.it/invision/>), IGN Italia (<https://it.ign.com/forum/>) and SpazioGames Forum (forum.spaziogames.it). We chose these web sites because they are popular amongst Italian players, engaging a high number of members in their communities, with Everyeye counting 337,522 registered users, IGN Italia 17,476, and SpazioGames Forum 64,239. The administrators agreed to publish the link to the survey as a new post in the relevant sections of the forums. From these sources, we expected to recruit people that were passionate in video game playing.

Beyond that, we also shared the survey link on different social networks and social media (viz. Facebook, LinkedIn, Instagram) and via e-mail: by following a snowball sampling technique, we asked people to forward the link to their contacts. In this way, we expected to capture more casual gamers than in dedicated forums.

By clicking on the survey link, participants were introduced to the survey and asked to provide their informed consent if they so decided. A welcome message briefly introduced the survey highlighting that there were no answers that were better than others or preferable and that we were interested in understanding how people behaved and played during the lockdown.

The survey consisted of four sections. In the first (*Playing habits prior to the entry into force of the lockdown*), participants were asked about their gaming habits *before* the national lockdown (*To answer these*

questions, please think of the six months prior to March 8, 2020), concerning the frequency of play and the amount of time they used to spend playing, the game platform they used, the number of playing sessions per day and their duration, the moment of the day in which they played the most, and their favored game genres. The closed-ended single-answer questions were: *Before the lockdown went into effect, how often did you play video games? On average, how many hours a week did you play video games? How many gaming sessions did you have on average during a day? How long was each play session? Who did you usually play with?*). Three multiple-choice questions were addressed to capture the video game platforms that the participants used, their preferred video game genres, and their preferred playing times (*Before the lockdown went into effect, what type of platform did you usually play on? What kinds of games did you usually play? What time of day did you usually play?*). As for the video game platforms, we did not include any Virtual Reality (VR) technology among the possible answer options, because we preferred to focus on the most popular ones.

An open-ended question was designed to capture their motivations for playing (i.e., *For what reason(s) did you play before the lockdown?*). In the same section, they were also asked to describe the reasons why they usually played single-player or multi-player through an open-ended question (i.e., *For what reason(s) did you usually play alone? or For what reason(s) did you usually play with other people?*, depending on the response given to the closed-ended question on “social play”, i.e., *Who did you usually play with?*).

In the second section (*Current daily life*), participants found a list of questions about their everyday life during the lockdown (i.e., from 8 March 2020 onwards): for instance, where they were living (e.g., type of dwelling), with whom, or if they had been separated from their significant others. They were also explicitly asked if they perceived a change in their lifestyle since the beginning of the enforced restrictions, as well as to describe the impact of the legislative measures on both their work and their leisure activities.

The third section (*Current playing habits*) replicated the questions about the gaming habits of the first section (e.g., about the video game platforms used, the preferred playing times, etc.), this time relative to the *period starting 8 March 2020*. The participants were asked to focus on their personal experience of the lockdown and how they used video games during this period: they were asked to specify and describe any changing/unchanging elements that they noticed in their daily gaming/non-gaming activities and to provide specific episodes as examples, when possible, to ground their responses. All the questions were displayed

sequentially, each in a stand-alone dedicated page, so to minimize the possibility that an advance reading of the subsequent questions could influence the response to the previous ones. Two open questions were aimed to check whether participants generally perceived a change in their motivations of play during the lockdown (*For what reason(s) do you currently play video games?; and Do you think that the changes produced by the lockdown measures in your life have also affected the way you play video games? If so, in what ways?*). Then, we also asked the reasons why they usually played alone or with others: *For what reason(s) do you usually play alone in this period? or For what reason(s) do you usually play with other people in this period?* depending on the response given to the closed-ended question about “social play” during this period. Finally, we asked participants to focus on certain aspects of their experience and use of video games: *How have your daily activities changed (if they have) during this period? What role (if any) has playing video games for you in relation to this aspect? Please explain in what way: you can also refer to examples that come from your concrete gaming experiences; How do you feel in this period? What role (if any) has playing video games for you in relation to this aspect? Please explain in what way: you can also refer to examples that come from your concrete gaming experiences; Think about your everyday freedom during this period. What role (if any) has playing video games for you in relation to this aspect? Please explain in what way: you can also refer to examples that come from your own experiences with gaming.*

In the last section of the survey (*Demographic data*) demographic information were collected (e.g., age range, gender, education, profession).

Participants did not receive any monetary compensation for participating in the survey. The ethical board of our University approved the study and participants had to give their informed consent before having access to the survey. Participants had as much time as they wanted to complete the survey. On average, it took about 20 minutes for it to be completed.

3.2 Participants

As we were interested in recruiting people that were affected by the measures of the Italian Government, we only included players who were living in Italy at the moment of the questionnaire completion. The participants also had to be video game players, playing (no matter how much) both before and during the

pandemic, and be of age (18 years and older). In total, 614 people accessed the online survey: 175 participants did not fill any data and were considered as dropouts. Moreover, since the data collection was computerized, thus facilitating anonymity (Godinho et al., 2016), the probability to include careless respondents, i.e., participants who provide inaccurate or inattentive answers (Bowling et al., 2016; Ward & Meade, 2018), was higher than in offline surveys (Johnson, 2005; Crede, 2010). Therefore, as the questionnaire included mostly open-ended questions, we built on the works of Holland and Christian (2009) and Smyth et al. (2009) to identify careless participants (N=109) on the basis of the “substantive response” criterion, i.e., whether the participant’s answers thematically correspond to the subject matter (Brühlmann et al., 2020, p.11): copy-paste phrases and meaningless sequences of letters (e.g., “A”, “hashgha”, “test”) were excluded, as in Brühlmann et al. (2020).

The final sample consisted of 330 respondents (completion rate, 53.7%; 257 males, 69 females, 4 non-binary). Age ranged from 18 to more than 65 years and the largest part of the sample (37.9%, N=125) was aged between 27 and 35 years old. The largest part of the respondents had a remunerated employment (63.6%, N=210), 8 were housekeepers (2.4%), 81 were students (24.5%) and only a minor part was unemployed (9.4%, N=31). As for their education, a few participants stopped studying at middle school (9.1%, N=30), most had a high school diploma (39.1%, N=129) or a bachelor/master’s degree (40%, N=132), while a minority had a post-graduate education (11.8%, N=39). More than half of the participants (58.2%, N=192) lived in inland cities, while the remaining ones were located in small towns (39.4%, N=130) or lived in isolated dwellings (2.4%, N=8).

Figure 1, Figure 2, and Figure 3 display data about the participants’ playing times. Figure 4 and Figure 5 depict the number of gaming sessions per day and their duration respectively. Figure 6 reports on the usual modality of social playing, while Figure 7 and Figure 8 display the platforms used by the participants and their preferred video game genres. All the graphs report data referring to both before and during the pandemic.

FIGURE 1 HERE

FIGURE 2 HERE

FIGURE 3 HERE

FIGURE 4 HERE

FIGURE 5 HERE

FIGURE 6 HERE

FIGURE 7 HERE

FIGURE 8 HERE

3.3 Data analysis

We performed a thematic analysis (Braun & Clark, 2012; Saldaña, 2013) to identify recurrent themes and to link the data collected to the research questions. This method is widely used in HCI studies: it is highly

flexible and can be applied across a range of theoretical and epistemological approaches (Braun & Clark, 2006).

We initially adopted an inductive, rather than hypothetical-deductive, stance (Patton, 1990). In other words, top-down analysis with pre-existing conceptualizations and theory was inhibited in the initial coding phases where we emphasized a bottom-up approach (Glaser & Strauss, 2017). However, it would be naïve to think that all the preconceived beliefs and perspectives could be left out of the analysis: in this sense, the researchers' reflexivity brought preconceived beliefs into the dialogue during the iterative process of the analysis, discussing them rather than seeking to omit or ignore them (Harry et al., 2005).

First, the first and the second authors familiarized themselves with the data independently reading through the entire data set twice to identify initial ideas and possible patterns. In this phase, we adopted a descriptive approach, where patterns were identified within the explicit or surface meanings of the data, and the analysts were not looking for anything beyond what the participants had written (Braun & Clark, 2006).

Then, the data were coded independently by the first and the second authors, who defined the initial open codes: the data were broken down by extracting relevant sentences and labeling them with codes like "all days look the same" or "overthinking". Here we started moving towards a more interpretative approach, which entails an attempt to theorize on the significance of the patterns found and their broader implications and meanings (Patton, 1990). The two researchers, who had partially different backgrounds, one with a focus on psychological sciences, and the other one with a focus on computer science and social and anthropological sciences, were looking for the elements that could identify the changes in daily life experienced by the participants during the lockdown and the different kinds of video game usage in this context. We analyzed the whole dataset (the responses given by the participants to all the open-ended questions in the survey) giving full and equal attention to each data item.

Then, the same researchers reviewed the generated codes and their application to assess consistency (MacQueen et al. 2008). This process entailed a constant comparison between the open codes developed by the two researchers applied to each data point. Inconsistencies were mainly related to discrepancies in labeling the same concepts (e.g., "laziness" for one coder and "boredom" for the other, which resulted in keeping the latter as better describing the underlying concept). In a minority of cases, two codes were

condensed into one or new codes were developed, when the discussion between the two researchers led to identify clearer commonalities or distinctions among the meanings of the data points. This process went through the whole data set. As is common in qualitative research adopting an interpretative approach (e.g., Yardley, 2000; Harry et al., 2005; Braun & Clark, 2013) as well as within HCI (e.g., Jun et al., 2018; Yang & Neustaedter, 2018), no numerical reliability rating is reported, because our goal was to reach an intersubjective consensus, where each point of difference was debated and clarified until the coders agreed on appropriate usage of the set of codes (Harry et al., 2005). In total, 90 open codes were identified.

In the second phase, the codes were grouped into conceptual categories through axial coding by each coder separately. In this stage, we attempted to go deeper into the latent content of the data, starting to identify and examine the ideas and conceptualizations informing the semantic content of the data (Boyatzis, 1998; Braun & Clark, 2006). We sought to pinpoint the kinds of strategies that the participants attempted to enact through playing to deal with the unsatisfying aspects of their lockdown life, also identifying the underlying needs that originated such attempts, as well as the video game aspects that could address them. The two researchers then discussed the categories identified resolving discrepancies, also using a graphical map displaying the relationships among the open codes and between the open codes and the emerging axial categories. Again, the goal of this phase was to reach consensus on a shared intersubjective interpretation. This eventually yielded 12 axial categories (*temporal acceleration, temporal meaningfulness, temporal regulation, time traveling, emotional relief, emotional safeness, emotional enhancement, social reworking, self-isolation, safe sociality, spatial traveling, spatial safeness*).

The axial coding categories were then amalgamated to create a more defined hierarchy forming key related categories. The resultant four selective codes correspond to the central themes emerging from the answers to the survey, which capture the most important elements that may give a response to our research questions.

Finally, we explored how the extant literature (especially on escapism and on the usage of video games during difficult life moments) could help us in further interpreting our themes, using it as leverage for insight that can bring new perspectives (Furniss et al., 2011). On the basis of this final step, we defined a model of escapism that outlines how players may escape through different modalities from dissatisfying aspects of their own reality into video game worlds.

4 FINDINGS

We recount four themes emerging from the data analysis, namely *dealing with a new temporality*, *managing “stressful” emotions*, *reworking social relations and interactions*, and *finding new “places” to inhabit*. They are specific to the group of participants who accessed the survey and responded to the open-ended questions in a way that we considered qualitatively acceptable: these conditions frame the results within the context in which the data were gathered. All that considered, we believe that these findings may be of wider interest and applicability.

TABLE 1 HERE

By and large, most of the participants (93.6%, N=309) experienced consistent changes in their daily routines and activities during the crisis. In this context, video games played a major role. Interestingly, only few participants (8.8%, N=29) mentioned “fun” as a reason to play video games during the pandemic, while fun was reported as a motivation for playing by 235 participants for the period before the lockdown (71.2%). Actually, during the pandemic, the participants appeared to be engaged in a variety of uses of video games, addressing the temporal, emotional, social, and spatial transformations occurred in their daily life. Thirty-five

(10.6%) participants used video games to address all these kinds of change; 126 (38.2%) participants addressed three kinds of change; 103 (31.2%) participants addressed two kinds of change; and 49 (14.9%) participants addressed one kind of change. Only 17 (5.2%) participants reported that they did not use video games for addressing any of these changes. This shows that the majority of the participants were able to employ video games in multiple ways, counteracting the abrupt changes induced by the pandemic across different aspects of their daily life.

Table 1 summarizes the main findings of our study. The first column (“Dimension”) refers to the main themes emerging from the analysis. “Life during the lockdown” describes how the participants perceived the transformations engendered by the pandemic. “Video game usage” illustrates how the gaming practices unfolded during the crisis and how participants resisted life transformations by means of video game technology. Finally, “Side effects” illustrates the unexpected consequences of video game usage, showing the complex interaction between the technology and the life changes emerging from the crisis.

In the following, we first focus on the changes that occurred in people’s temporality during the national lockdown and how their daily time was affected by playing. Then, we describe the range of emotions elicited by the crisis and how the participants used video games to cope with and act upon them. Third, we examine how participants’ sociality was impacted by the government measures and how video games helped them redefine their social relations and interactions. Finally, we will report on how the enforced seclusion reframed the players’ perception of space and how this related to their gaming practices.

4.1 Dealing with a new temporality

The lockdown measures deeply affected the everyday time of most of the participants (90%, N=297), while only a minority (10%, N=33) could not identify any change in their experience of time. Social practice research has stressed that time may be seen as *produced* within the social practices in which people are situated (Orlikowski & Yates, 2002; Rapp, 2022). In this perspective, “practices” are all those routinized activities that people perform in their everyday life consisting of a number of interconnected elements, like physical and mental activities, background knowledge, norms and shared meanings (Schatzki, 2001). The lockdown measures impacted people’s everyday practices dramatically, and this also affected the time of

their daily life. More precisely, they reported that their time became i) stretched, ii) repetitive, and iii) disrupted, entailing subjective perceptions of boredom, emptiness, and suspension.

Many participants (43.9%, N=145) described the time of the lockdown as stretched and slow-moving, as their day-to-day tasks and goals suddenly disappeared. When they found themselves less employed or unemployed due to the shutdown of their jobs, their days grew “*longer*”, making them perceive the lockdown time as *boring*. Several participants (17.9%, N=59) also suggested that lockdown time was essentially *repetitive and circular*, because of the lack of engagement in work practices or other distractions, reporting that identical days repeated endlessly. These participants perceived the lockdown time as meaningless and empty, its value disappearing. Finally, a consistent number of participants (40%, N=132) suffered from the *disruption* of their daily schedules, because the lockdown reconfigured their everyday practices changing their duration and rhythms and blurring the boundaries, for instance, between working and free time, as well as between day and night times. As temporal landmarks were not available anymore, these participants expressed a generalized perception of being stuck in a suspended time, no longer regulated by established schedules.

In sum, the majority of respondents stressed that time during the lockdown was longer, less meaningful, and more disrupted than the pre-pandemic time. In this context, video games were a resource for resisting the detrimental consequences of the pandemic time. More precisely, video games offered an alternative temporality where participants could find a refuge, experiencing i) faster, ii) more meaningful, and iii) structured times, as well as iv) a nostalgic past.

As time became stretched, video games allowed many participants (41.2%, N=136) to fast-forward through the day by undertaking a digital adventure that could keep them busy for long periods of time, while any other task, such as “*cleaning the house*” (P13) or “*reading, doing exercises or sunbathing in the garden*” (P249) did not work to this aim. In other words, video games enabled players to contrast the excessive length of the pandemic days by acting directly upon their perception of time: “*Video games allow me to have a false perception of time, so that it seems to pass faster*” (P98). Participants recognized that playing has distinct features, compared with other media. The interactive experience that video games offer, which enables players to change the course of action within the digital world – “*differently from TV shows and movies*”

(P284), provided them with new objectives and reestablished their sense of agency, hastening their time perception and pushing away their sense of boredom.

In addition, the emptiness of the lockdown time was partially filled by the mental stimulation elicited by those games that encouraged several participants (13%, N=43) to *“learn something new, providing some creative space”* (P228). Video games partially compensated for the shortness of stimuli and the loss of meaning that characterized the lockdown time. These players, for instance, enjoyed being engaged in mental effort and having their *“attention focused on something”* (P278): this moved them beyond the flatness of those days, introducing difference in the “repetition of the same”. Time spent in video games, for them, was much more meaningful than the time spent in dealing with daily matters, because games provided diversified experiences that could attract their attention. However, a few participants (1.8%, N=6) acknowledged that the attempt to give sense to meaningless days by playing was illusory, merely filling their sense of void by making them believe to be engaged in a productive activity. This sensation usually emerged when participants spent too much time playing: for instance, P330 reported that *“I have spent whole nights changing parameters, modding games, joining Discord¹ and other communities to fix bugs, and downloading new games... And then one morning I felt that I was tired, as if I had been working, but in fact I just swamped with problem solving... and I realized how all that had been absolutely useless [...]. I'm probably looking for a way to be productive...”*.

It is worth to notice that video games also helped some participants (7.6%, N=25) adapt to the disruptiveness of the new temporality: *“when I play, I also do it to recover normality, the sense of time, with respect to both the week (working days and non-working days) and the day (time for work, time for relax)”* (P1). For these participants playing is *“a definite activity, in a definite time”* (P195), which helps *“create partitions in their lives”* (P136), acting as a landmark between different practices. Playing supported them in managing the temporal messiness introduced by the lockdown, bringing the agency upon time back into their hands: *“The game marks the end of the day, helps me push away work-related thoughts and recover the dimension of the home. It helps to transition from the professional to the domestic environment”* (P76). In other words, the activity of playing provided players with a sort of structure that they had lost during their everyday life.

¹ Discord is a platform that allows users to communicate by using voice- and video-chats, video calls or text messaging.

Finally, a fair number of participants (17.3%, N=57) reported that playing video games entailed the loss of the sense of time, allowing them to be virtually carried away from the present time (e.g., P258). These players were transferred into their own yesteryears: *“I have been living it as a kind of late-adolescence transgression to the daily home routine”* (P305), as if the participants were *“young again”* (P190); P303 noted that *“It is a new experience which brings me back to adolescence”*. For them, this “time travelling” was positive because it helped them shy away from the current crisis: *“It makes me lose track of time and also of space; I totally put myself into the game and, suddenly, I am no longer quarantined during the greatest crisis of the 21st century”* (P288).

To summarize, playing video games enabled most of the participants to partially resist the temporal transformations of the lockdown, speeding up a time that had become stretched, filling up its voidness, providing means for managing a new temporal order, or carrying them far away from the present. By and large, video games acted as a “temporal refuge”, where many participants could find an alternative temporality with respect to that experienced during the lockdown: a time that was faster, more meaningful, and structured than the “real” time, and could even point to a more serene past.

The temporal relief offered by video games was also connected with an increase of the frequency and duration of play. By and large, a general rise of the play frequency can be observed during the lockdown, since 85.5% of the participants (N=282) declared to play every day or almost every day (with respect to 64.8% before the lockdown) and 69.4% (N=229) played between 7 and more than 20 hours per week (with respect to 51.8%, N=171 before the lockdown). Moreover, while before the pandemic the majority of the participants (53.9%, N=178) played during only one, specific, moment of the day, during the lockdown the largest group of participants comprised those who played in different moments of the day (67%, N=221).

Some participants (3.9%, N=13) explicitly described these new gaming times in a positive and often nostalgic way: they finally had the opportunity to indulge in their interests, without the usual limits imposed by everyday duties. As they perceived to have fewer work and social responsibilities, they were more able to cope with the sense of guilt that was previously associated with intensive playing. By contrast, other participants (2.1%, N=7) saw this reallocation of the playing times in a negative light: they considered that a serious investment in playing was *“a waste of time”* (P140), preferring instead to do something *“more constructive”* (P59). Others (2.4%, N=8), declared to be aware of the risks of a prolonged evasion into a

virtual world and recounted their efforts to let not things get out of their hands by constantly monitoring their time of play. When these endeavors were not pursued, detrimental effects of gaming could emerge. For several respondents (5.8%, N=19) playing resulted in an overall dysregulation of the times of their daily living, whereby gaming became an “entity” which “*crosses the legitimate borders, taking possession of that time that should be allocated to do other things*” (P186), like working and sleeping (e.g., P60, P122, P154, P172).

4.2 Managing “stressful” emotions

The majority of respondents (88.2%, N=291) reported that they experienced disturbing emotions during the lockdown due to the abrupt transformations in their daily lives: such emotions were mostly conceptualized and termed as “stress”. In these participants’ eyes, stress is a multifaceted feeling that encompasses i) states of tension and alert characterized by mental rumination and overthinking, ii) states of uncertainty, characterized by fears and worries, as well as iii) states of gloominess, characterized by lack of energy, sadness, and feelings of numbness.

The first meaning of stress, which revolves around tension-related emotions, was reported by 58.8% of the participants (N=194): they experienced difficulties in the regulation of their sleep-wake rhythms; they found it hard to focus their attention and had recurrent and persistent negative thoughts; or they lived various forms of “*existential inquietude*” (P148). The second meaning of stress, which was related to emotions of fear and the sensation of being isolated and exposed to danger, was reported by 20.9% of the participants (N=69): these emotions were traced back mainly to the perceived risk of contagion, which compromised their sense of security, replacing it with uncertainty. Finally, stress was also connected with gloomy feelings by 47.6% of the participants (N=157). Being deprived of external stimuli, these participants described a certain emotional flatness, namely the perception of being bereft of energy and numb, as well as reported states of sadness.

Faced with these negative emotions, many participants showed to have a residual and well-tested resource at their disposal to cope with the perceived adversities, that is playing. Most people (81.5%, N=269) reported that playing helped them fight distressing emotions, replacing coping strategies that were no longer available

due to the lockdown measures (e.g., hanging out with friends). In this sense, video games were employed as a means to escape from the current negative emotions and find a shelter into an alternative “emotional world”, by i) refocusing players’ attention and making them feel lighter emotions, ii) producing a sense of control, or iii) enhancing specific feelings.

To the participants who experienced tension-related emotions, playing was a resource for removing themselves from the negative thoughts that intrusively crept into their daily life, moving away from the pandemic and diving into a different environment on which to focus their wandering mind (54.2%, N=179). P263, for instance, said, *“I love games that depict immersive stories, such as Mass Effect, so that it feels like watching a movie but without the same inaction. I also love strategy and management games, as my mind always runs, and these types of game allow me to focus.”* In other words, playing counteracted overthinking by providing players with a *“precise objective to reach”*, thus temporarily filling in the mental space which was previously occupied by the crisis. When players’ attention was focused on the game, their mind wandering was minimized. These participants also reported that games allowed them to run away from the pressures of the present towards different worlds where the emotions experienced were lighter, more positive: the healing side of this escape consisted in making them feel as if they were *“free from responsibilities”* (P292), shielded from the troubles engendered by the pandemic. Devoting time to their passion also turned out to be a good way to recover a sense of normality, which had been disrupted by the lockdown. Playing connected these participants mentally to the emotional states experienced before the outbreak, when gaming represented a moment of calm in between the everyday routines: *“Playing has a relaxing effect on me because it is one of the daily activities that I perform that reminds me of the previous normality, so I enjoy carrying it out, even for a little time”* (P131).

As for the fear-related emotions, video games appeared to act on the participants’ sense of insecurity (14.2%, N=47). Through playing, they could partially recover their feeling of control over a world that had rapidly become unsafe and unpredictable, finding comfort in a virtual environment where *“rules are clear and there are no surprises”* (P72). On this note, an emblematic description is offered by P291, who wrote: *“While I play, I don't think. I am in control of the situation. That is why I prefer strategic management games like Stellaris, Crusader Kings 2, Europa Universalis 4. [...] if something goes wrong, I can always reload a previous saving.”* In contrast to the new vulnerability engendered by the pandemic, video games for these

people could convey a sense of tranquility and security: sometimes, the simple fact of “*holding the joystick in hand*” (P168) had a soothing, calming influence on these players.

Finally, for several participants (27.6%, N=91), who perceived stress in terms of low-spirited mood, feelings of worthlessness, and even physical fatigue, video games were a source of emotional transformations and enhancement, allowing them to feel more active or even “*more alive*” (P261). These participants were not necessarily in search of positive feelings; they just enjoyed the diversity of the emotions arising from playing, as opposed to the monotony of their lockdown life: in this perspective, even post-apocalyptic theme-based video games became an emotional aid, since they “*enhance the mood*” (P77), transforming their apathy into the willingness to fight for something (in the game). In the eyes of these participants, two main characteristics of playing accounted for such emotional function. First, games provided challenges, problems, and a series of obstacles that when overcome made them feel satisfied, “*as when you tick some boxes of your to-do list*” (P304). Second, games impacted the participants’ bodily feelings. When they felt tired and devoid of energy, they appreciated the physical exertion required by playing. They stressed how this conveyed sensations similar to those experienced in sports, like enthusiasm and excitement: “*Playing online with my friends against other players makes me feel the same adrenaline you feel during a competitive game of volleyball or soccer.*” (P274). From this perspective, playing offered a valuable resource of energy and emotions that could not be found elsewhere.

To summarize, video games appeared to be beneficial in counteracting the “stress” that many participants lived. Video games offered alternative “emotional worlds” to which to escape from the stressing emotions of the everydayness, providing both the feeling of normality and the excitement that were lost in “real” life. It is worth to emphasize that this ability to emotionally escape into a virtual world was already owned by players who used games to face negative emotions: their recount of their gaming experiences showed a remarkable awareness of the emotional effects of games. This competence is particularly evident when these participants explicitly described how specific game genres were able to elicit certain desirable emotional states. As a matter of fact, the data about game genre preferences before and after the outbreak are consistent (see Figure 8). This may signal that people kept playing with their preferred games, exploiting what they already knew about their emotional impact. Interestingly, the possibility of using games to fight distressing emotions was mentioned by several participants (17.6%, N=58) also with reference to the period before the pandemic. This

may indicate that video games were already used to deal with undesired emotional states and during the pandemic the need to take shelter into another emotional world became more urgent. Moreover, 48 (14.6%) participants were able to use video games to address two different kinds of emotions during the lockdown (e.g., tension-related emotions and fear-related emotions), which shows their ability to use video games in different ways for addressing the various emotional states that they were experiencing.

Nevertheless, side effects of this use also emerged: for several participants it was impossible to foresee all the emotional consequences of video game playing in this novel scenario, and the practice of getting away from current emotions went beyond their expectations. A few participants either experienced physical exhaustion and the sensation to be drained of energy (2.4%, N=8), or overreacted to in-game events (1.5%, N=5), such as wins and losses, expressing emotions of anger: for instance, P181 highlighted that playing *“heavily changes my mood, if I lose, I get really really mad and I stay in a very bad mood for a long time. [...] However, it does not control my anxiety and tension; if anything, it is all the way around.”* In this sense, the “tension” that they had attempted to get rid of came into the foreground again, as exemplified by P48: *“If I play a little it relaxes me, by temporarily alienating from reality. Playing for longer stresses me as if it were a job.”* For other participants (1.5%, N=5), prolonged playing made the initial emotional enhancement evolve into a sense of worthlessness: *“It usually helps me with stress, but if I play for more than half an hour I have the opposite effect. I feel caged, chained, I want to do something else, putting my energy into more useful activities. I pay more attention to this aspect than before: I don’t want to feel useless and helpless”* (P140).

4.3 Reworking social relations and interactions

During the lockdown, some people became separated from their significant others: the 13.9% of the sample (N=46) lived alone during the lockdown and felt isolated or frustrated by the impossibility of meeting their loved ones. The remaining participants (86.1%, N=284) lived with one or more housemates (7%, N=23) or with their own family (79.1%, N=261), that is parents, partners, or children. However, even the majority of the participants who lived with someone (64.8% of 284, N=184) emphasized that they were separated from

other parents, siblings, or friends, reporting a feeling of loneliness, sometimes feeling forced instead into a cohabitation with other people 24 hours a day, seven days a week.

In this context, video games offered a way to escape from either the monotone and constrictive sociality of the household or the loneliness coming from the lockdown restrictions, as they i) encouraged the formation of new social patterns, ii) provided means to isolate from the household members and the outer world, or iii) gave opportunities to regain a sense of normalcy and stability.

Some of the participants who lived with family or other housemates (6.4%, N=21) found in video games a means to bring together the household members (e.g., partner, children/parents, siblings), possibly creating novel social patterns. In a context where the possibilities of encountering people outside of the household were nullified and the opportunities for sharing engaging experiences within the home were scarce, gaming introduced a diversified activity to be enjoyed together, livening up interactions that would have been monotone otherwise. Some of these participants (3%, N=10), for instance, played with other household members games specifically designed to encourage collocated interactions (e.g., party games like Just Dance); others (1.5%, N=5) played alone with their preferred single-player game but sitting next to their partner, or reported that they engaged their family members as observers of their most difficult gaming sessions, so as to exhibit their mastery in overcoming difficult in-game obstacles; still others (0.9%, N=3) discovered that they had certain gaming interests in common with some housemates, thus sharing opinions about game-related topics. As these participants started to involve their household in this passion, they also felt less alone in facing the difficulties brought by the crisis: *“Playing keeps me company, sometimes we play all together: it actually helps me get close to the people I share the quarantine with and to feel the burden of this period less heavy”* (P45). Nevertheless, when the household members were not interested in playing, a few participants (0.9%, N=3) rearranged their gaming practices not to leave them alone. For example, they moved their gaming sessions to a different moment of the day: *“Playing likely isolates me from the people I live with, that is why I have been trying to play at night, so that I don’t have to give less room to my social relations”* (P246). This, nonetheless, negatively impacted their schedules, making them wake up later in the morning and resulting into further “temporal disorders”.

This said, isolation was not always viewed in negative terms by the participants. The pressure coming from enforced cohabitation was frequently reported as a cause for conflicts in the household. In these

circumstances, several participants (17.6%, N=59) expressed the need to isolate themselves and regain a control over their private space, getting away from the intrusiveness of the other household members: this space was found in the game worlds, as P61 exemplifies: *“Had the situation been different, I would have separated from my wife. Since this is not possible, I play with video games so that I can fill that time that would otherwise be free, with the chance of quarrelling with her, which I don’t want to happen again.”* At times, isolation also took a physical form, as players secluded themselves in a separate room, where the gaming platform was placed: *“Being in a different room, separated from the rest of the house, the console isolates me from my family: I can play in peace, without being disturbed by them”* (P58). Nonetheless, for a few participants (0.9%, N=3) this isolation went beyond their intention, fostering a further deterioration of their in-house relations. For instance, P226 reported: *“I do not have any social interactions at the moment, except for those with my partner and, maybe, playing is actually worsening the relationship with her”*.

In the eyes of some of these participants (5.2%, N=17), however, isolation assumed even a wider meaning. As the health crisis unavoidably crept into their homes through mass and social media that incessantly reported events related to the pandemic, which soon also dominated the small talk of everyday life, these participants felt the need to be isolated not only from the inner (i.e., the household) but also from the outer world (i.e., the society, the global health emergency). They thus kept themselves apart from discussions about the pandemic and from the flow of news that permeated the domestic environment. These players found refuge in video games, either playing alone or with other online friends. A few of these respondents (0.9%, N=3), for instance, particularly appreciated the possibility to have alternative, more game-oriented, topics to discuss: *“When I play with my friends, I am used to talk with them while we are playing or right after the session, to exchange views about in-game strategies. It is a good topic for conversing, when there is not so much else to recount or share”* (P174).

Of course, the lockdown measures also dramatically impacted the participants’ wider social networks. Moreover, because the “other” was viewed as a potential carrier of the disease, face-to-face social relations began to feel intrinsically uncertain. Nonetheless, many respondents (26.7%, N=88) found an element of stability in video games, something that helped them counterbalance the detrimental social consequences of the lockdown by allowing them to reconnect with their lost sociality. Since they were already used to meet their friends within the game worlds, these worked as a bridge between their social life before and after the

COVID-19 outbreak. While the world was going through dramatical transformations, something in their life remained the same: they could continue meeting their distant friends safely in the gaming world. “*There is something different from the way I played before the pandemic: I play much more often online with my friends. Staying in touch with them makes me feel safer*”, reported P299. To this aim, these participants combined a series of applications that are specifically designed for the gamers’ community, such as Discord, with other technologies (mobile phones, social media, and in-game chats). Still, in these respondents’ view, playing online was seen as something different and more intimate than a mere chat with friends. Rather, they could do something together, sharing meaningful and emotional experiences within the game environments: “*I often play with friends. We meet in arenas, lost cities, we parachute into the mountains... you can almost breathe the experience*” (P175). Actually, a few of these participants (1.5%, N=5) also attempted to expand their social networks within the game world: while opportunities for meeting new people in the offline world were hindered by the lockdown, video games allowed them to recover old bonds (like childhood friends) or to look for new encounters around the world.

Nevertheless, these online interactions did not always involve significant others. Several respondents (9.4%, N=31) reported that they were looking for a generic, social presence in games, something that could act as a social window on the world: for instance, in video games, “*I can speak with other people who are outside my working and family inner circles*”, said P297.

In sum, during the lockdown, most participants were deprived of the possibility of regulating processes of separation and closeness, as they either were not able to safeguard their private sphere or were isolated from their wider social networks. Video games helped many of them escape from their current unsatisfying sociality, by redefining the bonds they had with their family members, recovering their private space, or connecting with old and new friends. It is worth to notice that some participants (2.7%, N=9) reported that they were using games both to self-isolate and to reconnect with their pre-pandemic social relations: this may indicate that, for them, self-isolation did not entail an absolute withdrawal from social interactions; instead, video games were a means for replacing the sociality of their household, which they considered oppressive, with a more desirable one.

All these game-supported social practices may explain why the number of participants declaring to usually play alone decreased during the lockdown (50.3%, N=166 vs. 60.3%, N=199 before the lockdown).

Participants who reported to mostly play alone gave as a reason e.g., their gaming preferences (“*I usually play alone*”, P95), personal characteristics (e.g., “*I was not a social person before, I am not now*”, P80), or technological equipment (“*My Internet connection is too slow to play online*”, P304). However, a consistent number of these participants (9.4%, N=31) still emphasized that they sought in games some form of “connection”, agreeing on the fact that the mere act of playing kept them company. They appreciated that they could just “*interact with something*” (P284) within a populated world, in which Non-Playing Characters (NPCs), could give a sense of social presence.

4.4 Finding new “places” to inhabit

Before the pandemic, daily life was normally scattered among different places that constituted the physical and psychological landmarks of people’s daily routines. A routine is a form of repetitive behavior that becomes wired in the people’s daily practices as it recurs over time (Giddens, 1984) and is enacted in a particular place (Casey, 2001). In this perspective, to inhabit a “place” not only means to “dwell” in a particular “space”, meant as a three-dimensional environment in which objects are situated and events occur (Harrison & Dourish, 1996). Rather, it means to create, adopt, and maintain the routines that are rooted in that space. While interacting with spaces, people build internal representations of them (Tuan, 1980): in this way, they develop a sense of “place”, that is a space enriched of cultural and social meanings, expectations, pattern of behaviors, and cognitive representations (Harrison & Dourish, 1996).

During the lockdown, routines were confined within one single space, namely the house. Most of the participants started working remotely or became unemployed (88.5%, N=292), thus spending most of their time in there. Still, a house is not automatically a home and all those elements that represent “home” to an individual (emotions, relations, affections) may extend beyond the household in other places (Blunt & Dowling, 2006). Therefore, when all the different places of their daily routines were narrowed to the house, these participants were also estranged from those pieces of habitation that they had actively built over the course of their lives. “Staying at home” could then become an oppressive and alienating, rather than comforting and ensuring, experience. In this novel scenario, video games represented a means to escape into either i) distant environments or ii) safer, more meaningful, “places”.

Several participants (15.8%, N=52) recounted their explorations of new worlds that were far removed from the places of their everyday life, both in space and time: *“I recently bought AC Odyssey: venturing to the various islands of Ancient Greece and being so close to the sea makes me feel as if I were there, even if only for a short time”* (P288). The illusion of being elsewhere, albeit only virtually, of “traveling” and exploring, was highly appreciated by these participants. They loved to dive into virtual spaces strongly resembling of real-world landscapes, like huge cities and natural environments, such as woods, deserts, or seashores: *“I was lucky enough to play The Witcher, a game where you have the chance to live in a boundless environment. As I traveled across a realistic continent, I forgot to be locked down within four walls”* (P258). Another example is given by P77, who wrote: *“Before [the Covid-19 outbreak] I mostly played to take my mind off things and relax. Now, playing is a real method of evasion. Currently, the game activity that most helps me feel free despite the restrictions consists in traveling between different islands and then moving across open spaces.”* In some cases, the sensation of being in a “real” environment was conveyed by the possibility to trace a gaming experience back to the real-world travels the participants made before the outbreak: *“It partially compensates for the impossibility of traveling, which is very important to me. For example, two days ago I was playing Horizon Zero Dawn and, suddenly, I stopped watching a sunset in the game. It reminded me of a sunset when I was in China, last summer. For a moment it was as if I were transported somewhere else. I think it is pretty important right now to travel in this way”* (P2). These virtual journeys constituted a means to get away from the lockdown that prevented them from traveling to faraway places.

Other participants (9.1%, N=30) played games with the aim to extend their existence beyond their houses, so as to substitute for the meaningful places that used to ground their daily routines but were no longer available: *“The main function [of playing] is to act as a refuge from the home environment, both physically (I play with headphones), and for the sensation of being transported into another place that I experience when I play”* (P186). These participants played to “get out of the house” and find a “spatial shelter” in the game world: for instance, P110 played an edition of *The Sims* series, a video game that simulates the real life by allowing players to manage real-life-like characters, that is the Sims. Gameplay usually takes place at the Sims’ house, but these characters may also explore public spaces like bars, gyms, pools, or beaches. In P110’s case, this meant that she could make her Sims enjoy a dinner at a restaurant or visit a museum, all activities that were prohibited during the lockdown.

This may be interpreted in the light of the opposition between the notions of space and place we mentioned above (Harrison & Dourish, 1996). During the pandemic, the exploration of the “world” was perceived as extremely dangerous due to the spreading of the virus. Game worlds, of course, had no such fate, as P25 ironically suggested: *“I can put my hands on the bad guys without having to respect the rule of one meter away.”* More importantly, they provided a sort of “virgin” structure – namely a space – to which players could ascribe new meanings while playing, defining more certain rules and enacting routines that could partially substitute for those disrupted by the crisis. While the world became a far less secure place, game spaces could be transformed into comfortable places, novel pieces of habitation where many participants could find a sense of “ontological security” (Giddens, 1991; Dupuis & Thorns, 1996), i.e., perceive a continuity between the space and their identity, and thus feel in control of the environment.

In sum, during the lockdown a considerable number of participants found their possibilities of moving and travelling nullified and their homes turned into spaces in which they feel entrapped. However, many of them had the opportunity to escape from the narrow four walls of their houses through video games, by travelling to distant environments or rediscovering in the game world a sense of “place” that was partially lost.

Notably, only 3 participants (0.3%) enacted both the strategies by using games to travel and, at the same time, find novel pieces of habitation. This may indicate that for the majority of the participants the desires of finding uncertain spaces through traveling, or safer places to inhabit appeared to be mutually exclusive.

However, the replacement of real-world places with virtual ones was not exempt from side effects: some participants (2.4%, N=8) reported that the prolonged stay into the game environments made them exercise less, also renouncing to do physical activity in the neighborhood (which was tolerated by the authorities). P45, for instance, reported that *“I do much less physical activity than before, and now I play sitting”*. This, in their eyes, appeared as a visible worsening of their lifestyle, which became more sedentary.

5. DISCUSSION

The first research question that drove this study was: How were commercial video games used during the pandemic and how did they impact the life transformations engendered by the crisis? We found that the COVID-19 pandemic affected the everyday practices of many participants, altering their sense of time and

space, reshaping both their intimate and wider social interactions, and eliciting a wide spectrum of disturbing emotions that were commonly reported as “stress”. In those circumstances, many participants felt that they could not rely on the coping strategies that they usually enacted before the crisis to face the difficulties of daily life, like meeting friends or traveling. However, most of the respondents were able to find additional resources: playing video games was precisely one of the “tools” that they used to counteract the unwanted consequences of the crisis. However, video game use also yielded several unexpected outcomes, which sometimes ended up worsening their already fragile condition.

The study findings suggest that the crisis shook the participants’ everyday life up, subverting their “taken-for-granted world” (Gardiner, 2000). Video games were part of this participants’ everydayness way before the pandemic outbreak (Crawford, 2012). It is not surprising, therefore, that their gaming activities changed along with the transformations occurred in their other everyday practices: many participants, for instance, modified the timing, the frequency, and the duration of their gaming sessions, as the schedule of their daily activities changed. However, gaming technologies did not only fit into the participants’ new lockdown life. Instead, their use was actively adapted by the participants to resist and rework consistent aspects of their new daily life, with either positive or detrimental effects. In fact, most participants set aside the idea of playing games merely “for fun”, while other uses became more prominent.

A way to further tie the findings together is to connect them with two overarching concepts that surface in all the four themes described above, namely *normality* and *uncertainty*, both pointing to an underlying strategy of *escaping* from the situation of the pandemic. These two concepts and the various forms of escapism we identify may provide evidence of the first main contribution of our study to HCI research: this refers to the identification of the multiple ways in which video games can address the heterogeneous dissatisfying aspects of the players’ reality, and a renewed understanding of escapism in the context of crises. Then, as a second contribution, we show that players are capable of “appropriating” the video game technology to deal with a critical event, adapting the malleability of video games to the needs arising from a novel world. We conclude this Section by highlighting that escapism is not a panacea without risks and offering a critical perspective on the phenomenon and possible countermeasures to deal with its potentially adverse effects.

5.1 Escaping into normality and uncertainty

As far as the first contribution is concerned, we found that video games allowed many players to escape from unsatisfying aspects of their lockdown life, eventually finding a refuge in worlds characterized by a greater sense of *normality* or *uncertainty*, as a partial compensation for the negative experiences that they were living.

The first term frames the coronavirus crisis as an example of a break from “normality”, identifying in the escape into video game worlds a main way to partially restore the order in the lives of the participants. We found that the pandemic, like other crises (Boin, 2005; Smith, 2005; Semaan & Mark, 2011, 2012), disrupted normality in a variety of ways. The crisis was characterized by a high degree of unpredictability (Rettie & Daniels, 2020; Pine et al., 2021), in line with other health emergencies (e.g., Gui et al., 2017; Taha et al., 2014). People had to retreat from their social life as interactions with others that were once part of the ordinary had suddenly been deemed unsafe; they lost their usual temporal landmarks and their daily schedules were perturbed or wholly compromised; they had no clear information about the duration of the lockdown, the pandemic and their own future, and started experiencing multifaceted stress-related emotions; their daily movements were dramatically reduced as the outdoor world had become a dangerous place.

It is common knowledge that undesirable life changes may have detrimental consequences for the individual (Aldwin and Stokols, 1988). People feel protected when they can rely on the constancy and regularity of their routines and environment and, conversely, feel threatened when this sense of order and continuity is destroyed (Giddens, 1991; Soleimani & Gharehbaglou, 2021). Previous research highlighted that players may find refuge in video games during sensitive or stressing life experiences (Iacovides & Mekler, 2019; Kardefelt-Winther, 2014; Kuo et al., 2016). Here, we observed that many respondents escaped into the game worlds to recover their lost normality.

The second term “uncertainty” is meant to suggest that the participants, by attempting to regain this new normal, also used video games to balance the imposed “certainty” entailed by the lockdown measures. In fact, while the outer world became too dangerous and unstable, home was the only place left that could be considered safe and predictable, even too much so. The government measures and the participants’ efforts to be shielded from the virus shaped a highly steady, “certain” lifestyle. The daily life became an endless

repetition of the same, and the “novelty” introduced by the possibility of meeting new people or visiting new places was erased. Most participants showed to poorly tolerate the consequences of this frozen way of living, experiencing boredom and emotional flatness, perceiving their time as empty and circular, and seeing both home and social interactions as oppressive.

Again, many participants tried to escape from this extremely certain world to the more exciting and “uncertain” worlds of video games. Even though all games convey a sense of control, as they are intrinsically interactive (Egenfeldt-Nielsen et al., 2016), they also have an element of randomness or chance (Caillois, 1962; Schell, 2014), which contributes to create a more interesting and engaging experience. In this sense, this research shows that, far from merely increasing unpredictability, a health crisis like the COVID-19 pandemic may also crack possibilities of finding relief in certainty: escape into video games allowed most participants to find elements of surprise and novelty that define both the game and the ordinary life but were disappearing due to the lockdown measures.

5.2 Four ways to escape from reality: A model of escapism in the context of crises

As we have seen, most participants attempted to deal with the consequences of the pandemic by either recovering a sense of normality against the sudden and unpredictable transformations of the real world or exposing themselves to the uncertain against the extremely certainty characterizing the lockdown life. Both the attempts were realized by escaping from the pandemic world into the worlds of video games. The resulting “escapism” may be described as a multifaceted phenomenon enabled by the video games’ characteristics, which allowed most participants to run away from the unsatisfying aspects of their lockdown life in different ways.

Escapism, as we have pointed out in the Background Section, is mostly seen as a unitary notion, as an activity that moves an individual from a burdensome reality to a pleasurable “non-reality” (Evans, 2001). While this is often framed in a negative light (e.g., Deleuze et al., 2019; Kwon et al., 2011), it has also been noticed that escapism may offer relief from stress or elicit enjoyable experiences resulting in a positive outcome (Kardefelt-Winther, 2014; Hussain et al., 2021). Different facets of escapism have been mainly identified in the “degree” of escape, e.g., distinguishing between passive escapism, which entails a passive

observer like when we watch television, active escapism, which requires an input from the escapist, and extreme escapist, which can lead to addiction (Kuo et al., 2014; Warmelink et al., 2009).

FIGURE 9 HERE

Instead, we argue that escapism may present different forms depending on which video games' characteristics a player will exploit to run away from specific aspects of her unsatisfying reality. In Figure 9, we present a model depicting the diverse facets of the escapist phenomenon, which is relative to the crisis under exam but can also be used in other contexts. An excess of disruptive changes and unpredictability or an excess of certainty in the daily life may produce undesired temporality, emotions, sociality, and spatiality. Most of the participants in our study were unsatisfied of their temporal routines, emotional states, social interactions, and everyday spaces, as resulting from the transformations induced by the pandemic crisis. The dissatisfaction for such aspects of the current reality may motivate the desire to escape from the "real" world into alternative realities. Video games have been used by most of the participants precisely to this aim: in their eyes, playing was a meaningful activity that allowed them to get away from the negative transformations engendered by the pandemic. The specific characteristics of video games, such as their capability of speeding up the perception of time, eliciting exciting emotions, connecting to other players, or enabling immersion into distant worlds were exploited to enact different coping strategies addressing the diverse unsatisfactory aspects of their everyday life. This resulted into four different forms of escapism:

temporal escapism, emotional escapism, social escapism, and spatial escapism. Each, or a combination thereof, may eventually reestablish a player's lost normality or expose her to exciting uncertainty.

Temporal escapism is a means for dealing with undesired temporalities. It may resemble a sort of nostalgia, that is a psychological retreat in the past. Through the immersion into the virtual worlds depicted in video games, players may be projected back to their younger days or to life periods when their normality was still untouched by the crisis, and they had more free time to play. Moreover, temporal escapism may allow players to flee the unpredictability that follows from the disintegration of their habitual routines, by providing an activity that can be performed in a definite time and thus restructure normal schedules. At the same time, this kind of escapism is a means to run away from exceedingly slow-paced and repetitive temporalities into game worlds full of goals, exciting stimuli, and experiences that can attract the players' attention, speeding up their perception of time and allowing them to find a more "uncertain time".

Emotional escapism is a way to cope with emotional distress. It allows players to get away from the tension-related emotions generated by an unpredictable and stressful situation, by diving into alternative "emotional worlds", where emotions are lighter, and they may experience emotional states that characterized their past normal life. Moreover, emotional escapism may be a way for getting away from fear-related emotions engendered by a dangerous world, by providing a safer environment where rules are clearer, and thus allowing players to regain a sense of normalcy. Finally, emotional escapism shakes the emotional flatness coming from a reality that is too certain, by allowing players to be exposed to uncertainty and to feel thrilling emotions, no matter whether positive or negative.

Social escapism is a means for socially retreating from the world, finding in video games an environment where players may continue a social life that is endangered by the crisis. Video games allow players to meet their significant others safely in the game worlds, sharing experiences and doing things together: there, interactions are not distorted by the possibility of being harmed, and people may thus regain some social normalcy. Moreover, social escapism represents an opportunity to live extra-ordinary experiences with others and encounter new people in the game worlds, as well as to escape from the monotony of the everyday interactions that stems from an enforced cohabitation.

Finally, *spatial escapism* is enacted when the possibilities of movements become limited. It allows players to travel to distant places by diving into the game virtual environments or to reactivate memories of the travels made in the pre-crisis world, thus reconnecting to the uncertainty that real traveling usually provides. At the same time, spatial escapism, enabled by the “virgin” virtual spaces offered by the games, offers alternative environments where personal meanings can be ascribed, and a new secure “home” may be found.

A *first contribution* of this work, therefore, is to show how escapism is a diversified phenomenon arising from the multiple and diverse kinds of dissatisfactions that people may experience in a given situation. In the context of a crisis, like the COVID-19 pandemic, such dissatisfactions can be traced back to the excess of sudden changes and unpredictability provoked by the crisis, as well as to the excess of certainty yielded by the government responses. As a result, we may observe a desire to escape into more normal or uncertain worlds. Commercial video games appear to work perfectly to this aim: they can be used to enact different strategies that correspond to the four forms of escapism we identified, eventually pointing to the reestablishment of the lost normality or to the exposition to an exciting uncertainty. The four forms of escapism we identified profoundly challenge the idea that video game escapism should be considered as an unhealthy behavior, rather being dependent on the context in which it is performed (Evans, 2001). The model we have proposed may be used to understand the escape into video game worlds in all those situations, be they difficult moments of individual life or collective crises, when sudden changes disrupt a person’s or a community’s predictable world cracking the normal ways of living and exposing people to danger and precariousness, and/or reduce everydayness to an extremely certain and unvarying course of life making individuals feel bored, deprived of stimuli, and at loss of meaning.

This study not only advances our understanding of the escapism phenomenon and how it can be enacted during a crisis through play, but also contributes to research on the usage of video games during difficult life moments, which has mostly focused on the emotional and social benefits of games (Reinecke et al., 2012; Bowman & Tamborini, 2015; Collins & Cox, 2013; Russoniello et al., 2013; Banks & Cole, 2016; Iacovides & Mekler, 2019; Ji & Nishino, 2020; Haqq & McCrickard, 2020), by pinpointing also their positive spatial and temporal impacts. In other words, this research shows the “richness” and “complexity” of commercial video games when they are used to escape from reality and describes the complex interplay occurring between playing and the different unsatisfying aspects of people’s everyday life, like the sense of time and

the daily routines, the social interactions within and outside the household, the emotions of tension, fear, and gloominess, and the everyday movements and sense of space.

5.3 Appropriating video game technology

A *second contribution* of this study is to show how people may use video games to regain agency over themselves and the outside world, appropriating technology that was not originally designed for this purpose. We showed that participants found in already available video games a precious resource for dealing with the negative consequences of the crisis. They adopted “ready-to-use” technologies to rework their everyday practices and experiences during the lockdown, tailoring their use to their emergent needs as the situation evolved. This process of *appropriation* (Dourish, 2003; Lally, 2002) refers to the users’ ability to adapt the use of technologies to the changing contexts, in ways that were not foreseen in their original designs (Quinones et al., 2013). As we have seen in the background section, most HCI research on video games and crises was addressed to develop novel designs for ameliorating disaster response (Chittaro & Sioni, 2015) or for supporting resilience and psychological recovering of people hit by the disaster (e.g., Ji & Nishino, 2020; Haqq & McCrickard, 2020). By contrast, the exploration of how to harness technologies that are already available during a crisis has been mostly limited to social media, which were used to monitor the crisis’s evolution (e.g., Goolsby, 2010; Gomide et al., 2011), understand how people make sense of it (Shahid et al., 2020), or promote a more efficient crisis communication (Reuter et al., 2017).

Compared to these works, our research underlines, instead, the fundamental role that the appropriation of gaming technologies could play in supporting citizens’ self-help processes during a crisis. Appropriation may usually take several forms, being semantic, behavioral, or technological (Muller et al., 2016). In this research we found that participants both adopted usage patterns and ascribed meanings to video games that were not inscribed in their original designs, becoming active agents during the crisis.

On the one hand, novel video game habits, like playing in different moments of the day and for a greater amount of time, were performed as a response to the mutated conditions of the daily living and to achieve new goals (e.g., making time pass faster). We argue that this process of appropriation could occur because

most of the participants were experienced players who could draw on their competence in using video games to actively counteract the detrimental effects of the lockdown.

On the other hand, the meanings that were usually attributed to video games were reframed as the practices in which they were inserted changed. A crisis may reconfigure the nexus of meanings, values, norms, and routinized behaviors (Brand, 2010) of which a given practice consists (Schatzki, 2001). For instance, when the world became a far less secure place due to the pandemic and the possibilities of movement became limited, several participants highlighted how the meanings ascribed to the home were partially altered, which entailed the need to escape from the household rather than to find protection in it: they then attributed meanings that were previously associated with the real-world environments to the spaces of the games, finding in there meaningful and comfortable places.

We cannot claim with absolute certainty that the playing practices and meanings that we described in the Findings Section were not already present before the pandemic, as the survey was not designed to detect this aspect through the systematic comparison of the playing practices before and during the lockdown: rather, it aimed to explore in depth the pandemic reality and how the participants counteracted the transformations induced by the crisis through the usage of gaming technologies. Nonetheless, we may say that the relative importance of certain video game uses and of certain meanings ascribed to games changed in the participants' eyes during the pandemic. For instance, we observed that the "fun" element of playing, which normally qualifies the gaming activity as part of the leisure time, was overshadowed during the lockdown, when the participants found that playing could instead be a good way to get rid of tension, improve their household relationships, manage their daytime, or travel to distant places. Moreover, even though the questions that investigated the pre-pandemic situation went less in depth in exploring the usage of video games than those that investigated the lockdown period, the emotional use of video games had more importance in the participants' recounts of their motivation to play during the lockdown than in those referred to before the pandemic. Likewise, the spatial and temporal uses of video games were not even mentioned in the participants' answers to the questions about the motivations to play in the pre-pandemic world.

In this perspective, the insights offered by this work could encourage HCI research to keep exploring the processes of appropriation that are enacted during a personal or collective crisis, in order to identify the

already available tools that people could exploit to cope with a sudden change in their daily life. Research could also support people's agency during a crisis, encouraging technology appropriation and providing suggestions on how to make the best use of them.

5.4 A critical perspective on the usage of video games during a crisis

The multiple and complex impacts that video games had on the participants' lives also entailed a variety of unexpected, and sometimes unwanted side effects, which affected their everydayness negatively. For instance, participants' attempts to seek emotional refuge in the game could result in the sensation of being worthless and drained of energy, while spending an excessive amount of time playing could turn into an overall dysregulation of their already unstable schedules. In these cases, participants' competence in using games was not sufficient, and rather than counteracting the negative effects of the lockdown, playing reinforced some of them. In other words, the participants were not always able to effectively adapt the technology to the new "world" produced by the pandemic: their initial expectations about the possibility of gaining a positive effect from playing actually turned into a worsening of their condition.

This also means that the different forms of escapism we identified can slip from the players' hands producing unexpected negative outcomes, which is in line with previous research stressing that escapism has a relationship with depression, time wastage, negative mood, social anxiety, and loneliness (Blasi et al., 2019; Deleuze et al., 2019; Kwon et al., 2011; Liu & Chang, 2016; Snodgrass et al., 2014). Escapism, even in the context of a global health crisis when the "real" world becomes a very uncomfortable place, is thus not exempt from serious risks. In the participants' recounts, the negative side-effects of escapism appeared to be more prominent when players overindulged in such an escape by exceeding in the time spent on playing.

Possible countermeasures may be represented by design solutions that make the time of play more visible and players more aware of the "amount of escapism" enacted during a day. In particular, "seeing" or "feeling" time is important to become aware of whether the escapist strategies are getting out of control. To this aim, a research line that could be explored refers to lifelogging technologies, which continuously collect a variety of data about people's life (Rapp & Tirassa, 2017) and could be used to support people in detecting their own time of play. Users could be made aware of the time spent playing by designs that "materialize"

such time: for instance, designs embedded in the player's environment, like environmental lights that could constantly highlight the amount of the individual's playing time. Moreover, systems could prompt comparisons between data referred to the game world and the "real" world, further contextualized within the life circumstances in which they were collected, e.g., by pairing playing data with data about the "outside game world" interactions, to make people understand whether they are isolating too much from their "real-life" contacts. The issue here should not be to suggest or impose predefined, one-size-fits-all limitations of the playing time, but to make the player aware of how the game interacts with her life.

By and large, ethical issues when designing (or recommending) games that are extremely engaging and can thus support massive amounts of escapism should be always taken into account. Previous research, for instance, highlighted that games leveraging "alternative temporalities", like those that encourage the formation of shared times of play among players such as massively multiplayer online role-playing games, may dramatically increase players' retention within the game (Rapp, 2020; Rapp, 2022). This may lead to states of dependency on the game (Liu & Chang, 2016). HCI researchers should then always acknowledge and account for the potential dark sides of escapism. More transparency in communicating its potential double-edged effects to players (even contextually, during the activity of playing) could mitigate the risk, especially with reference to individuals that are not expert in using games to cope with unsatisfying aspects of reality and may thus overindulge in playing. The findings of this study could thus inspire the HCI community to focus more on the multiple and even double-sided impacts that the usage of ready-to-use technology may engender in a situation of crisis, also inspiring strategies for mitigating their negative consequences or for developing new designs that are exempt from such detrimental effects.

In the following section we move to outline some design implications coming from our study, thus responding to the second research question that drove our investigation.

6. IMPLICATIONS FOR DESIGN

We will now present a series of design implications for designing technologies for crises. These design considerations may be used for creating technologies addressing even non-habitual commercial video game players. Although they are grounded in the data coming from the COVID-19 crisis, which has its own

peculiar features, they may find wider applicability to all those individual or collective crises where people feel their time transformed, their emotions threatened, their sociality disrupted, and their habitual spaces harmed. In this sense, they are purposefully kept at a high level of abstraction so that they may be adapted to different crisis contexts.

6.1 Connecting with the past

The study findings show that when people feel that their time is disrupted and deprived of meaning during a crisis, they may find relief in another time, when their life was still not affected by the disaster event. Video games allow people to recollect memories of past experiences like travels, also reconnecting them to periods when they were less burdened with responsibilities. These may elicit sensations of calm and freedom from the current worries, rather than melancholy. In periods of crisis, when troubles increase, technology may thus provide a sort of “temporal shelter” where people may retreat for a while, reliving some episodes from their past or experiencing the “spirit” of the pre-crisis time.

HCI research has widely explored technologies for supporting the recollection of personal (Cosley et al., 2012; van Gennip et al. 2015) and collective memories (Jones & Ackerman, 2018), even investigating how technology may impact the act of remembering itself (Konrad et al., 2016). In the context of a crisis, we may think of technology (also in the form of augmented reality devices) prompting images, videos, or sounds of the places in which the user is located, as they were in a past time far before the beginning of the crisis. These could be retrieved from the personal archives of the user, tying the present to her youth or even her infancy. Interfaces that leverage tastes and smells (Maggioni et al., 2020) could also be used to trigger sensations related to a past world, potentially evoking “rich” memories (as in the madeleine episode recounted by Proust in “In search of lost time”). Alternatively, design may allow users to change the interface aesthetics of their everyday devices adopting “vintage” solutions: instead of keeping updating systems to the last version, which may also present cognitive costs (Bergman & Whittaker, 2018), users could downdate the appearance of the interfaces, bringing them back to the “visual zeitgeist” of an era when they were still exempt from the concerns of the present. This may also be achieved by suggesting that the person plays retro games (Wulf et al., 2018), by prompting recommendations about video games that she

could likely have played in her past (e.g., on the basis of her current preferences and age). Some popular video games also make use of cultural referents of past eras, embedding, for instance, references to media (such as music, film, and television) that epitomize memories of those periods (Sloan, 2014). Suggestions on playing these games could be prompted during crises, so as to help people reconnect to their own past.

6.2 Supporting emotion enhancement

We found that participants' emotions were negatively affected by the pandemic, which finds confirmation in recent studies exploring how the COVID-19 crisis increased people's distress (Bonati et al., 2021; Marzo et al., 2021). HCI research highlighted that design can support people experiencing such distress by creating "healing games" that allow them to relax (Ji & Nishino, 2020). Despite the importance of eliciting states of calm and relaxation, the findings of this study stress that people might experience a wide range of negative emotions during a crisis, including gloomy feelings, apathy, and sense of worthlessness. To fight against this psychological fatigue, players sought emotional stimulation by playing with a variety of games that could make them feel "alive" and active again.

In this perspective, designers could take inspiration from research on affective gaming (Nacke et al., 2011) to develop serious games specifically designed to enhance the emotional experience. Affective gaming systems rely on physiological interaction with the game, rather than on conventional controls (e.g., joystick), so that the player has to learn how to control her emotions to win the game. Instead of designing games that reward the user's ability to relax (e.g., Bersak et al., 2001), these crisis games could design winning conditions that favor more "thrilling" emotions. Further suggestions may come from somaesthetic design (Shusterman, 2008; Höök et al., 2015) and biofeedback research (Neidlinger et al., 2019), whose objective is to increase body awareness and proprioception by means of designs that are intended to focus the user's attention on different body parts and processes (Rapp, 2021). Wearable devices designed on these principles could be aimed at enhancing the sensitivity of the users' "active" emotional states. This does not mean that such technologies should drive users' emotions towards a certain direction; rather, they might redirect the users' focus toward them. Another suggestion, which does not rely on new hardware like wearables and biofeedback controls which could prevent widespread adoption, is to design games that encourage the self-

tracking of the player's emotions. Such games could simply ask the users how they feel after some relevant in-game events (e.g., a winning or a loss, or a turning point in the game storyline) and, after the end of a gaming session, display summarizations of the emotions experienced while playing, possibly highlighting the connection with the in-game events and their evolution over time, like other self-tracking technologies do (e.g., Rivera-Pelayo et al., 2017; Rapp et al., 2018). In this way, players could become aware of their in-game emotional states and see, e.g., if they overreacted to certain situations, or if the game experience does not provide them with the hoped-for relief (e.g., because they are playing too much), potentially enabling regulative strategies.

6.3 Controlling the excessive exposure to information

The present study shows that during a crisis people may feel overwhelmed by the “outside world”, that is the flux of information on the crisis coming from the ecosystem of media and communication technologies (e.g., social networks, social media), thus needing to isolate themselves. Previous research found that the simple exposure to disasters through media is related to psychological distress and vicarious trauma experiences (Choi et al., 2021; Ahern et al., 2002). Similar conclusions are reached by studies conducted on COVID-19 pandemic (Garfin et al., 2020; Liu & Liu, 2020). Moreover, information that is found on social media might not always be reliable, thus contributing to increasing conspiracy talks, rumors, and misinformation (Kou et al., 2017; Huang et al., 2015). In these conditions, uncertainty may rise, as well as fears and rumination may be intensified.

Players involved in our research found in the game worlds a social space free from crisis-related news and talks. Therefore, while HCI works showed how social media can be used for sharing news about the crisis and enhancing crisis-related communication (e.g., Hughes et al., 2014; Kogan et al., 2015), here we suggest that crisis technologies should not only guarantee the rapid dissemination of critical information and support the connection with others, but also shield the individual from the harming effects coming from repeated information exposure. This could be enacted by designing tools or plug-ins that allow the user to automatically filter out information displayed on their social media accounts, creating a sort of protected space. Similar technologies are already available to filter e.g., posts about politics, like Social fixer

(<https://socialfixer.com/>). However, lack of knowledge and awareness is a major drawback to crisis prevention and containment (Yaya et al., 2018), so that these technologies should be limited in their use: for instance, the user could switch the filter on only for a definite time frame; then, she would have to wait for a certain amount of time before being able to activate it again. Moreover, the most urgent and prominent information about the crisis should be always allowed. However, this sort of filter should always remain in the user's control, who should be the only authorized to enable or disable it to avoid potentially dangerous exploitations from third parties. Another approach could be to design social platforms where citizens may contribute to a participatory society in co-constructing better quality information. This could also be achieved by allowing citizens to interact with experts (such as scientists, policy makers, etc.) in commenting potentially ambiguous or harming news and building collective shared interpretations around important information, reducing the distress coming from unverified rumors and contradictory data.

6.4 Enabling the ascription of meaning to virtual spaces

Our study shows that people actively seek refuge in virtual worlds when they feel deprived of those “places” that are significant to them. Prior research found that COVID-19 pandemic disrupted place attachment (Counted et al., 2021), namely the emotional bond that people establish with certain places (Lewicka, 2011; Ramkissoon, 2020). Research also stressed that several emergency situations, like earthquakes and floods, might threaten the sense of belonging to a place (Carroll et al., 2008; Marshall et al., 2019; Schlosberg et al., 2020). Nonetheless, technology-based solutions to address these “spatial issues” are still scarce.

As people may ascribe meanings to virtual spaces replacing the places lost in the real world, researchers may design games specifically addressed to strengthen place exploration and attachment to the virtual world: this may be enacted by allowing people to customize not only the physical appearance of the environment but also the rules informing it (e.g., social or behavioral rules), influencing how other players or even NPCs will interact in there. This could be enabled also in non-gaming virtual environments, like online communities, where users could be provided with opportunities to create personalized virtual “rooms” or “homes” in which to invite other users to share experiences and discuss. Alternatively, location-based games, like Pokémon Go, could be addressed to the home, rather than to the wider city environment, using e.g., Simultaneous

Localization and Mapping technologies (Chong et al., 2015) in order to build indoor location-based games. Ascribing of meanings to places seems largely unavoidable as a basic way to relate to spaces we inhabit, and crises like the pandemic may reshape those meanings, making people's everyday environments more hostile or oppressing in their perception. Location-based games may thus enable players to newly look at such spaces and yield a reworking of their meanings and the finding of new opportunities in there.

7. LIMITATIONS

This research does not aim to give an exhaustive and representative overview of how Italian players reacted to the COVID-19 pandemic. The qualitative and explorative nature of the study and the ways in which the sample was recruited do not allow us to exclude that other ways of using video games, which were not explored in this research, were enacted during the pandemic. Therefore, even though we believe that the study findings may have wider applicability, they are specific to the group of participants that we surveyed. In this sense, the "numbers" reported in the article should not yield an inference of a larger generality for the conclusions than is justified, by slighting the specific context within which this conclusion is drawn: rather, they are reported to indicate how the findings identified are in fact characteristic of the set of the involved participants as a whole (Maxwell, 2010). However, the goal of this study, like most qualitative research, is not to generalize the findings to an entire population (Polit & Beck, 2010), but to provide a rich, contextualized understanding of some aspects of video game usage during a crisis.

A limitation of our study is that, while the survey was useful for us to capture the accounts of a high number of respondents and explore the range of ways in which video games were used during the pandemic, this method did not enable us to conduct a more dynamic and in-depth investigation of certain aspects that we found interesting when we analyzed the data (e.g., to identify the specific factors differentiating the participants who were able to use video games without suffering from unexpected side-effects from those that experienced a worsening of their overall condition while playing, or the impacts of specific video game genres and titles on the participants' life). The fixed form of the questions included in the survey did not allow us to adapt them to the specific participants and their recounts. A future study employing in-depth qualitative methods like semi-structured interviews could provide more insights about these points.

Moreover, the way we designed the survey might have led some participants to lose interest in giving meaningful responses, since they were asked to respond to many open-ended questions, which require focus and effort. However, we excluded those responses that did not meet quality criteria, in accordance with previous works (Holland and Christian, 2009; Smyth et al., 2009; Brühlmann et al., 2020), in order to improve the significance of the data. This explains why a number of participants were excluded from the final sample.

Another limitation is that we did not specifically investigate the role of immersive games or platforms (like VR technologies) during the pandemic. As spatial escapism into game environments emerged as a key finding of this study, and VR technologies might potentially enhance this particular form of escapism, future research could explore this point in depth.

Finally, we captured only a portion of the pandemic phenomenon, narrowing the research to the limited time period of the lockdown. We assumed that this period would have exhibited aspects of the current crisis to a greater extent, so that it would have allowed us to better focus on its peculiarities. However, since we did not gather longitudinal data that could have accounted for how the participants' experience evolved over time, we consider this research as preliminary, which could be widened in future work.

8. CONCLUSION

HCI research has made substantial efforts in exploring how technology may support citizens during a crisis. However, the understanding of people's usage of existing technology has been mostly limited to social media. In the absence of specific technologies addressed to help citizens in facing the COVID-19 global pandemic, we investigated the role played by commercial video games in supporting individuals' endeavors to deal with the changes provoked by the COVID-19 crisis.

To this aim, we surveyed 330 Italian players asking them to report on their experience of playing during the national lockdown, finding that such circumstances heavily affected their perception of time, their emotional states, their social relations and interactions, and their experience of space. In these ongoing transformations that disrupted their everyday life, players attempted to find a sort of new normality while playing, as well as to find novelty and uncertainty in game play, by temporally, socially, emotionally, and spatially escaping into video game worlds.

In doing so, they appropriated the gaming technologies, which brought agency back into their hands, enacting game practices and ascribing meanings to video games that were not originally inscribed in their designs, according to their emergent needs. This also brought to light the richness and complexity of commercial video games when used to deal with a crisis, which could even go against the players' intentions, producing unexpected side effects.

On the basis of these findings, we concluded the article with a set of design suggestions that could be applied to support people in managing the changes engendered by a crisis, emphasizing that technology could offer a temporal shelter, shield from an overwhelming amount of information, support the enhancement of emotions, and favor the ascription of meanings to virtual spaces. We hope that the insights recounted in this article could inspire future strands of research in the field of crisis technologies and in the usage of video games to deal with difficult life moments.

REFERENCES

Abt, C. C. (1970). *Serious Games*. New York: Viking Press.

Ahern, J., Galea, S., Resnick, H., Kilpatrick, D., Bucuvalas, M., Gold, J., & Vlahov, D. (2002). Television images and psychological symptoms after the September 11 terrorist attacks. *Psychiatry: Interpersonal and Biological Processes*, 65(4), 289-300. doi: 10.1521/psyc.65.4.289.20240.

Alcaldinho, J., Freil, L., Kelly, T., Marland, K., Wu, C., Wittenbrook, B., Valentin, G., & Jackson, M. (2017). Mobile Collaboration for Human and Canine Police Explosive Detection Teams. In *Proceedings of the Conference on Computer-Supported Cooperative Work & Social Computing (CSCW)*, 925–933. doi: 10.1145/2998181.2998271

Aldunate, R., Navarro, C., & Martín, D. S. (2019). Video Game-Based Platform to Improve Decision Making During Response to Large Scale Natural Disasters. *International Journal of Scientific & Technology Research*, 8(10), 3179-3188. ISSN 2277-8616

- Aldwin, C., & Stokols, D. (1988). The effects of environmental change on individuals and groups: Some neglected issues in stress research. *Journal of Environmental Psychology*, 8(1), 57-75. doi: 10.1016/S0272-4944(88)80023-9
- Alharthi, S. A., Torres, R., Khalaf, A., & Toups, Z. O. (2017). The maze: Enabling collaborative planning in games through annotation interfaces. In *Extended Abstracts Publication of the Annual Symposium on Computer-Human Interaction in Play (CHIPLAY)*, 615-620. doi: 10.1145/3130859.3130864
- Ambrosino, P., Fuschillo, S., Papa, A., Di Minno, M. N. D., & Maniscalco, M. (2020). Exergaming as a Supportive Tool for Home-Based Rehabilitation in the COVID-19 Pandemic Era. *Games for Health Journal*, 9(5), 311-313. doi: 10.1089/g4h.2020.0095
- Amerio, A., Lugo, A., Bosetti, C., Fanucchi, T., Gorini, G., Pacifici, R., Odone, A., & Gallus, S. (2021a). Italians do it ... less. COVID-19 lockdown impact on sexual activity: Evidence from a large representative sample of Italian adults. *Journal of epidemiology*, 292, 398-404. doi: 10.1016/j.jad.2021.05.117
- Amerio, A., Lugo, A., Stival, C., Fanucchi, T., Gorini, G., Pacifici, R., Odone, A., Serafini, G., & Gallus, S. (2021b). COVID-19 lockdown impact on mental health in a large representative sample of Italian adults. *Journal of affective disorders*, 292, 398–404. doi: 10.1016/j.jad.2021.05.117.
- Ancona, D. F., Okhuysen, G. A., & Perlow, L. A. (2001). Taking time to integrate temporal research. *Academy of Management Review*, 26(4), 512–529. doi: 10.2307/3560239
- Andersen, K. G., Rambaut, A., Lipkin, W. I., Holmes, E. C., & Garry, R. F. (2020). The proximal origin of SARS-CoV-2. *Nature Medicine*, 26(4), 450–452. doi: 10.1038/s41591-020-0820-9
- Balanzá-Martínez, V., Atienza–Carbonell, B., Kapczinski, F., & De Boni, R. B. (2020). Lifestyle behaviours during the COVID-19 – Time to connect. *Acta Psychiatrica Scandinavica*, 141, 399-400. doi: 10.1111/acps.13177
- Banks, J. & Cole, J. G. (2016). Diversion Drives and Superlative Soldiers: Gaming as Coping Practice among Military Personnel and Veterans. *Game Studies*, 16(2). ISSN:1604-7982

- Bastoni, S., Wrede, C., Ammar, A., Braakman-Jansen, A., Sanderman, R., Gaggioli, A., Trabelsi, K., Masmoudi, L., Boukhris, O., Glenn, J., Bouaziz, B., Chtourou, H., & van Gemert-Pijnen, L. (2021). Psychosocial Effects and Use of Communication Technologies during Home Confinement in the First Wave of the COVID-19 Pandemic in Italy and The Netherlands. *International journal of environmental research and public health*, 18(5), 2619. doi: 10.3390/ijerph18052619
- Beltran-Sanchez, J. A, González-Treviño, I. M., & Dominguez, A. (2020). Digital education in times of COVID-19: The experience of medical educators. In *2020 The 4th International Conference on Digital Technology in Education* (pp. 26-31). doi: 10.1145/3429630.3429633
- Bergman, O., & Whittaker, S. (2018). The Cognitive Costs of Upgrades. *Interacting with Computers*, 30(1), 46–52. doi: 10.1093/iwc/iwx017
- Bersak, D., McDarby, G., Augenblick, N., McDarby, P., McDonnell, D., McDonal, B., Karkun, R. (2001). Intelligent Biofeedback using an Immersive Competitive Environment. *Online Proceedings for Designing Ubiquitous Computing Games Workshop at Ubicomp'01* (pp. 1-6).
- Blasi, M. D., Giardina, A., Giordano, C., Coco, G. L., Tosto, C., Billieux, J., & Schimmenti, A. (2019). Problematic video game use as an emotional coping strategy: Evidence from a sample of MMORPG gamers. *Journal of Behavioral Addictions*, 8(1), 25–34. <https://doi.org/doi: 10.1556/2006.8.2019.02>
- Blunt, A. & Dowling, R. (2006). *Home*. London: Routledge.
- Boin, R. A. (2005). From crisis to disaster: Towards an integrative perspective. In R.W. Perry & E.L. Quarantelli (Eds.), *What is a disaster? New answers to old questions* (pp. 153–172). Philadelphia: Xlibris.
- Boldi, A., Rapp, A. (2021). Commercial video games as a resource for mental health: A systematic literature review. *Behaviour & Information Technology*. Doi: 10.1080/0144929X.2021.1943524
- Bonati, M., Campi, R., Zanetti, M., Cartabia, M., Scarpellini, F., Clavenna, A., & Segre, G. (2021). Psychological distress among Italians during the 2019 coronavirus disease (COVID-19) quarantine. *BMC psychiatry*, 21(1), 1-13. doi: 10.1186/s12888-020-03027-8

- Bopp, J. A., Mekler, E. D., & Opwis, K. (2016, May). Negative emotion, positive experience? Emotionally moving moments in digital games. *In Proceedings of the 2016 CHI conference on human factors in computing systems* (pp. 2996-3006). doi: 10.1145/2858036.2858227
- Bowling, N.A., Huang, J.L., Bragg, C.B., Khazon, S., Liu, M., & Blackmore, C.E. (2016). Who cares and who is careless? Insufficient effort responding as a reflection of respondent personality. *Journal of Personality and Social Psychology*, *111*(2), 218-229. doi: 10.1037/pspp0000085
- Bowman, N. D., & Tamborini, R. (2015). “In the Mood to Game”: Selective exposure and mood management processes in computer game play. *New Media & Society*, *17*(3), 375-393. doi: 10.1177/1461444813504274
- Boyatzis, R. E. (1998). *Transforming Qualitative Information: Thematic Analysis and Code Development*. SAGE Publications, Inc., Thousand Oaks, California.
- Brand, K. W. (2010). Social Practices and Sustainable Consumption: Benefits and Limitations of a New Theoretical Approach. In *Environmental Sociology: European Perspectives and Interdisciplinary Challenges*, edited by M. Gross and H. Heinrichs, 217–235. New York: Springer. doi: 10.1007/978-90-481-8730-0_13
- Braun, V. & Clarke, V. (2006). Using Thematic Analysis in Psychology, *Qualitative Research in Psychology*, *3*(2), 77-101. doi: 10.1191/1478088706qp063oa.
- Braun, V., & Clarke, V. (2012). Thematic analysis. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbooks of research methods in psychology*, Vol. 2: Research designs: Quantitative, qualitative, neuropsychological, and biological (pp. 57–71). American Psychological Association. doi: 10.1037/13620-004.
- Braun, V., & Clarke, V. (2013). *Successful qualitative research. A practical guide for beginners*. SAGE Publication Ltd., London.
- Broughton, M. (2020). Europe mobile game revenue hits record high; riot acquires hypixel. *The Gaming Economy*. Retrieved from: <https://www.thegamingeconomy.exchangewire.com/2020/04/17/europe-mobile-game-revenue-hits-record-high-riot-acquires-hypixel/>. Accessed 17 May, 2021.

- Brühlmann, F., Petralito, S., Aeschbach, L. F., & Opwis, K. (2020). The Quality of Data Collected Online: An Investigation of Careless Responding in a Crowdsourced Sample. *Methods in Psychology*, 2. doi: 10.1016/j.metip.2020.100022
- Byrne, M. (2020). Stay home: Reflections on the meaning of home and the Covid-19 pandemic. *Irish Journal of Sociology*, 28(3), 351-355. doi: 10.1177/0791603520941423
- Caillois, R. (1962). *Man, Play and Games*. London: Thames and Hudson.
- Calleja, G. (2010). Digital Ggames and Eescapism. *Games and Culture*, 5(4), 335–353. doi: [10.1177/1555412009360412](https://doi.org/10.1177/1555412009360412)
- Caroca J., Bruno M. A., & Aldunate R. G. (2016). Situated Learning based on Virtual Environment for improving Disaster Risk Reduction. *Journal of e-Learning and Knowledge Society*, 12(4), 81-92. doi: 10.20368/1971-8829/1192
- Carroll, B., Morbey, H., Balogh, R., & Araoz, G. (2009). Flooded homes, broken bonds, the meaning of home, psychological processes and their impact on psychological health in a disaster. *Health & Place*, 15(2), 540-547. doi: 10.1016/j.healthplace.2008.08.009
- Casey, E. S. (2001) “Body, Self and Landscape: A Geophilosophical Inquiry into the Place-World”, in P. C. Adams, S. Hoelscher and K. E. Till (eds) *Textures of Place: Exploring Humanist Geographies*. Minneapolis: University of Minnesota Press, pp. 403–425.
- Chittaro, L., & Buttussi, F. (2015). Assessing knowledge retention of an immersive serious game vs. a traditional education method in aviation safety. *IEEE transactions on visualization and computer graphics*, 21(4), 529-538. doi: 10.1109/TVCG.2015.2391853
- Chittaro, L., & Sioni, R. (2015). Serious games for emergency preparedness: Evaluation of an interactive vs. a non-interactive simulation of a terror attack. *Computers in Human Behavior*, 50, 508-519. doi: 10.1016/j.chb.2015.03.07

Choi, E.Y., Choi, S.H., Lee, H. (2021). Development and Evaluation of a Screening Scale for Indirect Trauma Caused by Media Exposure to Social Disasters. *International Journal of Environmental Research and Public Health*, 18, 698. doi: 10.3390/ijerph18020698

Chong, T. J., Tang, X. J., Leng, C. H., Yogeswaran, M., Ng, O. E., Chong, Y. Z. (2015). Sensor Technologies and Simultaneous Localization and Mapping (SLAM). *Procedia Computer Science*, 76, 174-179. doi: [10.1016/j.procs.2015.12.336](https://doi.org/10.1016/j.procs.2015.12.336).

Chun, S. A., Li, A. C. Y., Toliyat, A., & Geller, J. (2020). Tracking Citizen's Concerns during COVID-19 Pandemic. In *The 21st Annual International Conference on Digital Government Research (dg.o '20)*. doi: 10.1145/3396956.3397000

Clement, J. (2021). *Number of video gamers worldwide 2015-2023*. Retrieved from <https://www.statista.com/statistics/748044/number-video-gamers-world/>. Accessed March 5, 2021.

Cobb, C., McCarthy, T., Perkins, A., Bharadwaj, A., Comis, J., Do, B., & Starbird, K. (2014). Designing for the deluge: understanding & supporting the distributed, collaborative work of crisis volunteers. In *Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing (CSCW)*, 888-899. doi: 10.1145/2531602.2531712

Colley, R. C., Bushnik, T., & Langlois, K. (2020). Exercise and screen time during the COVID-19 pandemic. *Health Rep*, 31(6), 3-11. doi: 10.25318/82-003-x202000600001-eng

Collins, E., & Cox, A. L. (2014). Switch on to games: Can digital games aid post-work recovery? *International Journal of Human-Computer Studies*, 72(8-9), 654–662. doi: [10.1016/j.ijhcs.2013.12.006](https://doi.org/10.1016/j.ijhcs.2013.12.006)

Cosley, D., Sosik, V. S., Schultz, J., Peesapati, S. T., & Lee, S. (2012). Experiences with designing tools for everyday reminiscing. *Human-Computer Interaction*, 27(1–2), 175–198. doi: 10.1080/07370024.2012.656047

Counted, V., Neff, M.A., Captari, L., & Cowden, R.G. (2021). Transcending place attachment disruptions during a public health crisis: Spiritual struggles, resilience, and transformation. *Journal of Psychology and Christianity*, 39(4), 276-286. ISSN 0733-4273

Crawford, G. (2012). *Video Gamers*. London: Routledge.

Crede, M. (2010). Random responding as a threat to the validity of effect size estimates in correlational research. *Educational and Psychological Measurements*, 70(4), 596–612. doi: 10.1177/0013164410366686

De Choudhury, M., Monroy-Hernández, A., & Mark, G. (2014). "Narco" emotions: affect and desensitization in social media during the mexican drug war. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '14)*, 3563–3572. doi: 10.1145/2556288.2557197

Deleuze, J., Maurage, P., Schimmenti, A., Nuyens, F., Melzer, A., & Billieux, J. (2019). Escaping reality through videogames is linked to an implicit preference for virtual over real-life stimuli. *Journal of Affective Disorders*, 245, 1024–1031. doi: 10.1016/j.jad.2018.11.078.

Denef, S., Bayerl, P. S., & Kaptein, N. (2013). Social Media and the Police—Tweeting Practices of British Police Forces during the August 2011 Riots. In *Proceedings of the Conference on Human Factors in Computing Systems (CHI)*, 3471–3480. doi: 10.1145/2470654.2466477

Dey, N., Mishra, R., Fong, S. J., Santosh, K. C., Tan, S., & Crespo, R. G. (2020). COVID-19: Psychological and Psychosocial Impact, Fear, and Passion. *Digital Government: Research and Practice*, 2(1), 1-4. doi: 10.1145/3428088

De Schutter, B., and Vanden Abeele, V. (2010). Designing meaningful play within the psycho-social context of older adults. In *Proceedings of the 3rd International Conference on Fun and Games (Fun and Games '10)*. Association for Computing Machinery, New York, NY, USA, 84–93.

DOI:<https://doi.org/10.1145/1823818.1823827>

Di Renzo, L., Gualtieri, P., Pivari, F., Soldati, L., Attinà, A., Cinelli, G., Leggeri, C., Caparello, G., Barrea, L., Scerbo, F., Esposito, E., & De Lorenzo, A. (2020). Eating Habits and Lifestyle Changes During COVID-19 Lockdown: An Italian Survey. *Journal of translational medicine*, 18(1), 1-15. doi: 10.1186/s12967-020-02399-5

Dittus, M., Quattrone, G., & Capra, L. (2016). Analysing volunteer engagement in humanitarian mapping: building contributor communities at large scale. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing (CSCW)*, 108-118. doi: 10.1145/2818048.2819939

- Dourish, P. (2003). The Appropriation of Interactive Technologies. *Computer Supported Cooperative Work*, 12(4), 465-490.
- Dupuis, A., & Thorns, D. (1996). Meanings of Home for Older Home Owners. *Housing Studies*, 11(4): 485–501. doi: 10.1080/02673039608720871
- Durkin, K., & Barber, B. (2002). Not so doomed: Computer game play and positive adolescent development. *Journal of applied developmental psychology*, 23(4), 373-392. doi: 10.1016/S0193-3973(02)00124-7
- Durodié, B. (2020). Handling uncertainty and ambiguity in the COVID-19 pandemic. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12(S1), S61. doi: 10.1037/tra0000713
- Egenfeldt-Nielsen, S., Smith, J. H., & Tosca, S. P. (2016). *Understanding video games: The essential introduction*. Third Edition. London: Routledge.
- Endsley, M. R. (1988). Design and Evaluation for Situation Awareness Enhancement. In *Proceedings of the Human Factors Society 32nd Annual Meeting, Santa Monica, CA*. doi: 10.1177/154193128803200221
- Endsley, M. R. (1995). Toward a Theory of Situation Awareness in Dynamic Systems. *Human Factors* 37(1), 32-64. doi: 10.1518/001872095779049543
- Erikson, E. H. (1977). *Toys and reasons: Stages in the ritualization of experience*. New York, NY: Norton.
- Estrada, L. E. P., Groen, D., & Ramirez-Marquez, J. E. (2017). A serious video game to support decision making on refugee aid deployment policy. *Procedia Computer Science*, 108, 205-214. doi: 10.1016/j.procs.2017.05.112
- Evans, A. (2001). *This Virtual Life: Escapism and Simulation in Our Media World*. London: Vision.
- Fazeli, S., Zeidi, I. M., Lin, C. Y., Namdar, P., Griffiths, M. D., Ahorsu, D. K., & Pakpour, A. H. (2020). Depression, anxiety, and stress mediate the associations between internet gaming disorder, insomnia, and quality of life during the COVID-19 outbreak. *Addictive Behaviors Reports*, 12. doi: 10.1016/j.abrep.2020.100307

- Furniss, D., Blandford, A., & Curzon, P. (2011). Confessions From a Grounded Theory Phd: Experiences and Lessons Learnt. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '11)*, pp. 113–122. doi: 1145/1978942.1978960
- Gabbiadini, A., Baldissarri, C., Durante, F., Valtorta, R. R., De Rosa, M., & Gallucci, M. (2020). Together Apart: The Mitigating Role of Digital Communication Technologies on Negative Affect During the COVID-19 Outbreak in Italy. *Frontiers in psychology, 11*, 2763. doi: 10.3389/fpsyg.2020.554678
- Gampell, A. V., Gaillard, J. C., Parsons, M., & Le Dé, L. (2020a). Exploring the use of the Quake Safe House video game to foster disaster and disaster risk reduction awareness in museum visitors. *International journal of disaster risk reduction, 52*. doi: 10.1016/j.ijdr.2020.101670
- Gampell, A., Gaillard, J. C., Parsons, M., & Le Dé, L. (2020b). ‘Serious’ Disaster Video Games: An Innovative Approach to Teaching and Learning about Disasters and Disaster Risk Reduction. *Journal of Geography, 119*(5), 159-170. doi: 10.1080/00221341.2020.1795225
- Gardiner, M. E. (2000). *Critiques of Everyday Life*, London: Routledge.
- Garfin, D.R., Silver, R.C., Holman, E.A. (2020). The Novel Coronavirus (COVID-2019) Outbreak: Amplification of Public Health Consequences by Media Exposure. *Health Psychology, 39*(5), 355-357. doi: /10.1037/hea0000875
- Giddens, A. (1984). *The Constitution of Society: Outline of the Theory of Structuration*. Cambridge: The Polity Press.
- Giddens, A. (1991). *Modernity and Self-identity: Self and Society in the Late Modern Age*. California: Stanford University Press.
- Glaser, B. G. and Strauss, A. L. (2017). *Discovery of Grounded Theory Strategies for Qualitative Research*. Routledge, New York.
- Godinho, A., Kushnir, V., & Cunningham, J. A. (2016). Unfaithful findings: Identifying careless responding in addictions research. *Addiction, 111*(6), 955-6. doi:10.1111/add.13221

Goggins, S. P., Mascaro, C., & Mascaro, S. (2012). Relief Work after the 2010 Haiti Earthquake: Leadership in an Online Resource Coordination Network. In *Proceedings of CSCW 2012*, 57–66. doi: 10.1145/2145204.2145218

Gomide, J., Veloso, A., Meira Jr, W., Almeida, V., Benevenuto, F., Ferraz, F., & Teixeira, M. (2011). Dengue surveillance based on a computational model of spatio-temporal locality of Twitter. In *Proceedings of the 3rd international web science conference*, 1-8. doi: 10.1145/2527031.2527049

Goolsby, R. (2010). Social media as crisis platform: The future of community maps/crisis maps. *ACM Transactions on Intelligent Systems and Technology (TIST)*, 1(1), 1-11. doi: 10.1145/1858948.1858955

Gottman, J. M. (1986). The world of coordinated play: Same- and cross-sex friendship in young children. In J. M. Gottman & J. G. Parker (Eds.), *Conversations of friends: Speculations on affective development* (pp. 139–191). Cambridge University Press. Gottman, J. M. (1986). The world of coordinated play: Same- and crosssex friendship in young children. Cambridge, England: Cambridge University Press

Government (2020). Coronavirus, nuovo decreto “#iorestoacasa” estende a tutta Italia limitazioni aree più colpite. Retrieved from <http://www.salute.gov.it/portale/nuovocoronavirus/dettaglioNotizieNuovoCoronavirus.jsp?lingua=italiano&menu=notizie&p=dalministero&id=4184>. Accessed 17 February 2020.

Granic, I., A. Lobel, and & R. C. Engels. (2014). The Benefits of Playing Video Games. *American Psychologist*, 69(1), 66–78. doi: 10.1037/a0034857

Gualano, M. R., Lo Moro, G., Voglino, G., Bert, F., & Siliquini, R. (2020). Effects of Covid-19 Lockdown on Mental Health and Sleep Disturbances in Italy. *International Journal of Environmental Research and Public Health*, 17(13), 4779. doi: 10.3390/ijerph17134779

Gui, X., Kou, Y., Pine, K. H., & Chen, Y. (2017). Managing uncertainty: using social media for risk assessment during a public health crisis. In *Proceedings of the 2017 CHI conference on human factors in computing systems*, 4520-4533. doi: 10.1145/3025453.3025891

- Gui, X., Kou, Y., Pine, K., Ladaw, E., Kim, H., Suzuki-Gill, E., & Chen, Y. (2018). Multidimensional risk communication: public discourse on risks during an emerging epidemic. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, 1-14. doi: 10.1145/3173574.3173788
- Hagar, C. (2006). Using research to aid the design of a crisis information management course. *ALISE Annual Conference SIG Multicultural, Ethnic & Humanistic Concerns (MEH). Information Seeking and Service Delivery for Communities in Disaster/Crisis, San Antonio, Texas.*
- Hagar, C. (2010). Crisis informatics: Introduction. *Bulletin of the American Society for Information Science and Technology*, 6(10).
- Hall, L. C., Drummond, A., Sauer, J. D., & Ferguson, C. J. (2021). Effects of self-isolation and quarantine on loot box spending and excessive gaming—results of a natural experiment. *PeerJ*, 9, e10705. doi: 10.7717/peerj.10705
- Haqq, D., & McCrickard, D. S. (2020). Playing Together while Apart: Exploring Asymmetric and Interdependent Games for Remote Play. In *Extended Abstracts of the 2020 Annual Symposium on Computer-Human Interaction in Play*, 253-256. doi: 10.1145/3383668.3419886
- Harrison, S., & Dourish, P. (1996). Re-place-ing space: the roles of place and space in collaborative systems. In *Proceedings of the 1996 ACM conference on Computer supported cooperative work* (pp. 67-76). doi: 10.1145/240080.240193
- Harry, B., Sturges, K. M., & Klingner, J. K. (2005). Mapping the Process: An Exemplar of Process and Challenge in Grounded Theory Analysis. *Educational Researcher*, 34(2), 3–13.
<https://doi.org/10.3102/0013189X034002003>doi: 10.3102/0013189X034002003
- Hellmann, D., Maitland, C., & Tapia, A. (2016). Collaborative analytics and brokering in digital humanitarian response. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing (CSCW)*, 1284-1294. doi: 10.1145/2818048.2820067.
- Herrera, O. A., Lévano, M. A., Moreno, M., Aldunate, R. G., & Bruno, M. (2014). Realistic terrain model in a wildfire context for El Yali reserve: serious videogame simulation. In *2014 33rd International Conference of the Chilean Computer Science Society (SCCC)*, 54-56. IEEE. doi: 10.1109/SCCC.2014.16

- Holland, J. L., & Christian, L. M. (2009). The influence of topic interest and interactive probing on responses to open-ended questions in web surveys. *Social Science Computer Review*, 27(2), 196-212. doi: 10.1177/0894439308327481
- Höök, K., Ståhl, A., Jonsson, M., Mercurio, J., Karlsson, A., & Johnsson, E. C. B. (2015). Somaesthetic Design. *Interactions*, 22. doi: 10.1145/2770888.
- Huang, L., Starbird, K., Orand, M., Stanek, S., Pedersen, H. (2015). Connected Through Crisis: Emotional Proximity and the Spread of Misinformation Online. In *Proceedings of the 2015 Conference on Computer Supported Cooperative Work & Social Computing (CSCW '15)*. doi: 10.1145/2675133.2675202
- Hughes, A. L., St. Denis, L. A., Palen, L., & Anderson, K. M. (2014). Online public communications by police & fire services during the 2012 Hurricane Sandy. In *Proceedings of the SIGCHI conference on human factors in computing systems*, 1505-1514. doi: 10.1145/2556288.2557227
- Huizinga, J. (1938). *Homo ludens: Proeve ener bepaling van het spelelement der cultuur*, Amsterdam: Wolters-Noordhoff. First English translation: *Homo Ludens: A Study of the Play-Element in Culture*, London, Boston and Henley: Routledge and Kegan Paul, 1949.
- Hussain, U., Jabarkhail, S., Cunningham, G.B., & Madsen, J.A. (2021). The dual nature of escapism in video gaming: A meta-analytic approach. *Computers in Human Behavior Reports*, 3, 100081. doi: 10.1016/j.chbr.2021.100081
- Iacovides, I., & Mekler, E. D. (2019). The role of gaming during difficult life experiences. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 1-12). doi: 10.1145/3290605.3300453
- Iorio, I., Sommantico, M., & Parrello, S. (2020). Dreaming in the time of COVID-19: A quali-quantitative Italian study. *Dreaming*, 30(3), 199-215. doi: 10.1037/drm0000142
- Ji, C., & Nishino, H. (2020). Daydream: A Healing Game for Mitigating Quarantine-induced Negative Emotions with Music Adventure. In *Extended Abstracts of the 2020 Annual Symposium on Computer-Human Interaction in Play*, 64-67. doi: 10.1145/3383668.3419928

- Johnson, J. A. (2005). Ascertaining the validity of individual protocols from web-based personality inventories. *Journal of Research in Personality*, 39(1), 103–29. doi: 10.1016/j.jrp.2004.09.009
- Jones, J., & Ackerman, M. S. (2018). Co-constructing Family Memory: Understanding the Intergenerational Practices of Passing on Family Stories. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*, 1-13. doi: 10.1145/3173574.3173998
- Jun, E., Jo, B. A., Oliveira, N., & Reinecke, K. (2018). Digestif: promoting science communication in online experiments. *Proceedings of the ACM on Human-Computer Interaction*, 2(CSCW), 1-26. doi: [10.1145/3274353](https://doi.org/10.1145/3274353)
- Juul, J. (2009). *Casual Revolution: Reinventing Video Games and Their Players*. Cambridge, Massachusetts: MIT.
- Kafai, Y. B. (2008). Understanding virtual epidemics: children's folk conceptions of a computer virus. *Journal of Science Education and Technology*, 17(6), 523-529. doi: 10.1007/s10956-008-9102-x
- Kannan, R., Ramakrishnan, K., & Ojo, A. O. (2019). Social networking sites as communication tool for dengue related healthcare and wellness information. In *Proceedings of the 2nd International Conference on Software Engineering and Information Management*, 204-207. doi: 10.1145/3305160.3305163
- Kardefelt-Winther, D. (2014). The moderating role of psychosocial well-being on the relationship between escapism and excessive online gaming. *Computers in Human Behavior*, 38, 68-74. doi: 10.1016/j.chb.2014.05.020
- Kendall-Tackett, K. (2020). A social history of the corona virus. *Psychological Trauma: Theory, Research, Practice, and Policy*, 12(S1), S1. doi: 10.1037/tra0000955
- King, D. L., Delfabbro, P. H., Billieux, J., & Potenza, M. N. (2020). Problematic online gaming and the COVID-19 pandemic. *Journal of Behavioral Addictions*, 9(2), 184-186. doi: 10.1556/2006.2020.00016
- Ko, C. H., & Yen, J. Y. (2020). Impact of COVID-19 on gaming disorder: Monitoring and prevention. *Journal of behavioral addictions*, 9(2), 187-189. doi: 10.1556/2006.2020.00040

- Kogan, M., Palen, L., & Anderson, K. M. (2015). Think local, retweet global: Retweeting by the geographically-vulnerable during Hurricane Sandy. In *Proceedings of the 18th ACM conference on computer supported cooperative work & social computing (CSCW)*, 981-993. doi: 10.1145/2675133.2675218
- Konrad, A., Isaacs, E., & Whittaker, S. (2016). Technology-mediated memory: Is technology altering our memories and interfering with well-being? *ACM Transactions on Computer-Human Interaction*, 23(4). doi: 10.1145/2934667
- Kou, Y., Gui, X., Chen, Y., & Pine, K. (2017). Conspiracy talk on social media: collective sensemaking during a public health crisis. *Proceedings of the ACM on Human-Computer Interaction*, 1(CSCW), 1-21. doi: 10.1145/3134696
- Kraaijeveld, S.R. (2020). COVID-19: Against a Lockdown Approach. *Asian bioethics review*, 13(2), 1-18. doi: 10.1007/s41649-020-00154-y
- Kristensen, M., Kyng, M., & Palen, L. (2006). Participatory design in emergency medical service: designing for future practice. In *Proceedings of the SIGCHI conference on Human Factors in computing systems*, 161-170. doi: [10.1145/1124772.1124798](https://doi.org/10.1145/1124772.1124798)
- Kuo, A., Lutz, R. J., & Hiler, J. L. (2016). Brave new World of Warcraft: a conceptual framework for active escapism. *Journal of Consumer Marketing*, 33(7). doi: 10.1108/JCM-04-2016-1775
- Kwon, J.-H., Chung, C.-S., & Lee, J. (2011). The Effects of Escape from Self and Interpersonal Relationship on the Pathological Use of Internet Games. *Community Mental Health Journal*, 47(1), 113–121. doi: 10.1007/s10597-009-9236-1.
- Lally, E. (2002). *At Home with Computers*, Oxford: Berg.
- LaLone, N., A. Alharthi, S., & Toups, Z. O. (2019). A Vision of Augmented Reality for Urban Search and Rescue. In *Proceedings of the Halfway to the Future Symposium 2019*, 1-4. doi: 10.1145/3363384.3363466
- Latour, B. (1993). *We have never been modern*. Cambridge, MA: Harvard University Press.
- Lewicka, M. (2011). Place attachment: How far have we come in the last 40 years? *Journal of Environmental Psychology*, 31, 207-230. doi: 10.1016/j.jenvp.2010.10.001

- Lillian Yang, L. & Carman Neustaedter, C. (2018). Our house: living long distance with a telepresence robot. *Proceedings of the ACM on Human-Computer Interaction*, 2(CSCW), 1-18. doi: 10.1145.3274459
- Lin, S. C., Lee, T. J., Wang, H. W., & Chan, H. C. (2018). Developing the Immersion Virtual Reality Platform Based on Experiential Learning Cycle-Using Fire Disaster Prevention Education as an Example. In *2018 7th International Congress on Advanced Applied Informatics (IIAI-AAI)*, 948-949. IEEE. doi: 10.1109/IIAI-AAI.2018.00195
- Liu, C., & Liu, Y. (2020). Media exposure and anxiety during COVID-19: The mediation effect of media vicarious traumatization. *International journal of environmental research and public health*, 17(13), 4720. doi: 10.3390/ijerph17134720
- Liu, C.-C., & Chang, I.-C. (2016). Model of online game addiction: The role of computer mediated communication motives. *Telematics and Informatics*, 33(4), 904–915. doi: 10.1016/j.tele.2016.02.002
- López-Cabarcos, M. Á., Ribeiro-Soriano, D., & Piñeiro-Chousa, J. (2020). All that glitters is not gold. The rise of gaming in the COVID-19 pandemic. *Journal of Innovation & Knowledge*, 5(4), 289-296. doi: 10.1016/j.jik.2020.10.004
- MacQueen, K.M., McLellan-Lemal, E., Bartholow, K., Milstein, B. (2008). Team-based codebook development: structure, process, and agreement. In: Guest, G., MacQueen, K.M. (Eds.), *Handbook For Team-Based Qualitative Research*. AltaMira Press, Lanham, UK, pp. 119–136.
- Maggioni, E., Cobden, R., Dmitrenko, D., Hornbæk, K., & Obrist, M. (2020). SMELL SPACE: Mapping out the Olfactory Design Space for Novel Interactions. *ACM Transactions on Computer-Human Interaction*, 27(5), 1-26. doi: 10.1145/3402449
- Makwana, N. (2019). Disaster and its impact on mental health: A narrative review. *Journal of family medicine and primary care*, 8(10), 3090. doi: 10.4103/jfmpe.jfmpe_893_19
- Marino, A., & Pariso, P. (2020). Value Governance, Digital Divided and Economic Inequality in Italy during the Covid 19 Emergency. In *2020 The 4th International Conference on E-commerce, E-Business and E-Government* (pp. 45-53). doi: 10.1145/3409929.3414736

- Mark, G. J., Al-Ani, B., & Semaan, B. (2009). Resilience through technology adoption: merging the old and the new in Iraq. In *Proceedings of the SIGCHI conference on human factors in computing systems*, 689-698. doi: 10.1145/1518701.1518808
- Marshall, N., Adger, W. N., Benham, C., Brown, K., Curnock, M. I., Gurney, G. G., ... Thiault, L. (2019). Reef Grief: Investigating the Relationship Between Place Meanings and Place Change on the Great Barrier Reef, Australia. *Sustainability Science*, 14(3), 579–587. doi: 10.1007/s11625-019-00666-z
- Marzo, R. R., Ismail, Z., Htay, M. N. N., Bahari, R., Ismail, R., Villanueva III, E. Q., ... & Su, T. T. (2021). Psychological distress during pandemic Covid-19 among adult general population: Result across 13 countries. *Clinical Epidemiology and Global Health*, 10, 100708. doi: 10.1016/j.cegh.2021.100708
- Maxwell, J. A. (2010). Using Numbers in Qualitative Research. *Qualitative Inquiry*, 16(6), 475–482. doi: 10.1177/1077800410364740
- Mekler, E. D., & Hornbæk, K. (2019). A Framework for The Experience of Meaning in Human-Computer Interaction. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 1-15). doi: 10.1145/3290605.3300455
- Molesworth, M. (2009). Adults' Consumption of Videogames As Imaginative Escape From Routine. In *NA - Advances in Consumer Research Volume 36*, eds. Ann L. McGill and Sharon Shavitt, Duluth, MN : Association for Consumer Research, Pages: 378-383.
- Muller, M., Neureiter, K., Verdezoto, N., Krischkowsky, A., Al Zubaidi-Polli, A. M., & Tscheligi, M. (2016). Collaborative appropriation: How couples, teams, groups and communities adapt and adopt technologies. In *Proceedings of the 19th ACM Conference on Computer Supported Cooperative Work and Social Computing Companion (CSCW)*, 473-480. doi: 10.1145/2818052.2855508
- Muriel, D. and Crawford, G. (2018). *Video Games as Culture: Considering the Role and Importance of Video Games in Contemporary Society*. London and New York: Routledge.
- Nacke, E. L., Kalyn, M., Lough, C., & Mandryk, R. L. (2011). Biofeedback Game Design: Using Direct and Indirect Physiological Control to Enhance Game Interaction. In *Proceedings of the SIGCHI conference on human factors in computing systems (CHI)*, 103-112. doi: 10.1145/1978942.1978958

- Neidlinger, K., Toussaint, L., Dertien, E., Truong, K. P., Hermens, H., & Evers, V. (2019). Emotional prosthesis for animating awe through performative biofeedback. In *Proceedings of the 23rd International Symposium on Wearable Computers (ISWC '19)*, 312–317. doi: [10.1145/3341163.3346939](https://doi.org/10.1145/3341163.3346939)
- Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the corona virus pandemic (COVID-19): A review. *International Journal of Surgery*, 78, 185-193. doi: 10.1016/j.ijisu.2020.04.018
- Niu, S., Bartolome, A., Mai, C., and Binh Ha, N. (2021). #StayHome #WithMe: How Do YouTubers Help with COVID-19 Loneliness? *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, 1–15. doi: 10.1145/3411764.3445397
- Orlikowski, W. J., & Yates, J. (2002). It's about time: Temporal structuring in organizations. *Organization Science*, 13(6), 684–700. doi: 10.1287/orsc.13.6.684.501
- Pahayahay, A., & Khalili-Mahani, N. (2020). What Media Helps, What Media Hurts: A Mixed Methods Survey Study of Coping with COVID-19 Using the Media Repertoire Framework and the Appraisal Theory of Stress. *Journal of medical Internet research*, 22(8), e20186. doi: 10.2196/20186
- Palen, L., Anderson, K. M., Mark, G., Martin, J., Sicker, D., Palmer, M., & Grunwald, D. (2010). A vision for technology-mediated support for public participation & assistance in mass emergencies & disasters. *ACM-BCS Visions of Computer Science 2010*, 1-12.
- Palen, L., Soden, R., Anderson, T.J., & Barrenechea, M. (2015). Success & Scale in a Data Producing Organization: The Socio-Technical Evolution of OpenStreetMap in Response to Humanitarian Events. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '15)*, 4113-4122. doi: 10.1145/2702123.2702294
- Pantling, A. (2020). Gaming usage up 75 percent amid corona virus outbreak, Verizon reports. Retrieved from <https://www.hollywoodreporter.com/news/gaming-usage-up-75-percentcoronavirus-outbreak-verizon-reports-1285140>. Accessed January 23, 2021.
- Patton, M. Q. (1990). *Qualitative Evaluation and Research Methods*. SAGE Publications, Inc., Thousand Oaks, California.

- Piaget, J. (1951). *Play, Dreams and Imitation in Childhood*. Routledge & Kegan Paul Ltd., London.
- Pine, K. H., Lee, M., Whitman, S. A., Chen, Y., & Henne, K. (2021). Making Sense of Risk Information amidst Uncertainty: Individuals' Perceived Risks Associated with the COVID-19 Pandemic. *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, 1–15. doi: 10.1145/3411764.3445051
- Polit, D. F., & Beck, T. C. (2010). Generalization in quantitative and qualitative research: myths and strategies. *International Journal of Nursing Studies*, 47(11), 1451–1458. doi: 10.1016/j.ijnurstu.2010.06.004
- Prete, M., Luzzetti, A., Augustin, L., Porciello, G., Montagnese, C., Calabrese, I., Ballarin, G., Coluccia, S., Patel, L., Vitale, S., Palumbo, E., Celentano, E., La Vecchia, C., & Crispo, A. (2021). Changes in Lifestyle and Dietary Habits during COVID-19 Lockdown in Italy: Results of an Online Survey. *Nutrients*, 13(6), 1923. doi: 10.3390/nu13061923
- Qu, Y., Huang, C., Zhang, P., & Zhang, J. (2011). Microblogging after a major disaster in China: a case study of the 2010 Yushu earthquake. In *Proceedings of the ACM 2011 conference on Computer supported cooperative work (CSCW)*, 25-34. doi: 10.1145/1958824.1958830
- Qu, Y., P.F. Wu, & X. Wang. (2009). Online Community Response to Major Disaster: A Study of Tianya Forum in the 2008 Sichuan Earthquake. In *Proceedings of the 42nd Hawaii International Conference on System Sciences (HICCS '09)*, pp. 1-11, doi: 10.1109/HICSS.2009.330.
- Quinones, P. A., Teasley, S. D., & Lonn, S. (2013). Appropriation by unanticipated users: looking beyond design intent and expected use. In *Proceedings of the 2013 conference on Computer supported cooperative work* (pp. 1515-1526). doi: 10.1145/2441776.2441949
- Ramkissoon, H. (2020). Place confinement, pro-social, pro-environmental behaviors and residents' wellbeing: A new conceptual framework. *Frontiers in Psychology*, 11:2248. doi: 10.3389/fpsyg.2020.02248
- Rapp, A. (2018). Gamification for Self-Tracking: From World of Warcraft to the Design of Personal Informatics Systems. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18)*, 1-15. doi: 10.1145/3173574.3173654.

- Rapp, A. (2020). A gameful organizational assimilation process: Insights from World of Warcraft for gamification design. *Proceedings of the ACM on Human-Computer Interaction (PACM HCI)*, 4, CSCW3, Article 263 (December 2020), 25 pages. doi: 10.1145/3434172.
- Rapp, A. (2021). Wearable technologies as extensions: A postphenomenological framework and its design implications. *Human-Computer Interaction*. doi: 10.1080/07370024.2021.1927039
- Rapp, A. (2022). Time, engagement and video games: How game design elements shape the temporalities of play in massively multiplayer online role-playing games. *Information Systems Journal*, 32(1), 5-32.
<https://doi.org/10.1111/isj.12328>
- Rapp, A., Marcengo, A., Buriano, L., Ruffo, G., Lai, M., Cena, F. (2018). Designing a Personal Informatics System for Users without Experience in Self-tracking: A Case Study. *Behaviour & Information Technology*, 37(4), 335-366. doi: 10.1080/0144929X.2018.1436592
- Rapp, A., Tirassa, M. (2017). Know Thyself: A theory of the self for Personal Informatics. *Human-Computer Interaction*, 32 (5-6), 335-380. doi: 10.1080/07370024.2017.1285704.
- Reinecke, L., Tamborini, R., Grizzard, M., Lewis, R., Eden, A., & David Bowman, N. (2012). Characterizing mood management as need satisfaction: The effects of intrinsic needs on selective exposure and mood repair. *Journal of Communication*, 62(3), 437-453. doi: 10.1111/j.1460-2466.2012.01649.x
- Rettie, H., & Daniels, J. (2020). Coping and Tolerance of Uncertainty: Predictors and Mediators of Mental Health During the COVID-19 Pandemic. *American Psychologist*, 76(3), 427-437. doi: 10.1037/amp0000710
- Reuter, C., Kaufhold, M. A., Spielhofer, T., & Hahne, A. S. (2017). Social media in emergencies: a representative study on citizens' perception in Germany. *Proceedings of the ACM on Human-Computer Interaction*, 1(CSCW), 1-19. doi: 10.1145/3134725
- Riva, G., Mantovani, F., & Wiederhold, B. K. (2020). Positive Technology and COVID-19. *Cyberpsychology, Behavior, and Social Networking*, 23(9), 581-587. doi: 10.1089/cyber.2020.29194.gri
- Rivera-Pelayo, V., Fessl, A., Müller, L., & Pammer, V. (2017). Introducing mood self-tracking at work: Empirical insights from call centers. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 24(1), 1-

28. doi: 10.1145/3014058

Rodriguez-Morales, A. J., Cardona-Ospina, J. A., Gutiérrez-Ocampo, E., Villamizar-Peña, R., Holguin-Rivera, Y., Escalera-Antezana, J. P., ... & Sah, R. (2020). Clinical, laboratory and imaging features of COVID-19: A systematic review and meta-analysis. *Travel medicine and infectious disease*, 34, doi: 101623/j.tmaid.2020.101623.

Russoniello, C. V., Fish, M., & O'Brien, K. (2013). The Efficacy of Casual Videogame Play in Reducing Clinical Depression: A Randomized Controlled Study. *GAMES FOR HEALTH: Research, Development, and Clinical Applications*, 2(6), 341-346. doi: [10.1089/g4h.2013.0010](https://doi.org/10.1089/g4h.2013.0010)

Sabie, A. C., Brunnmayr, K., Weinberger, K., Singer, R. S., Vrecar, R., & Spiel, K. (2020). This is not the new normal: studying during a pandemic. *Interactions*, 27(4), 12-15. doi: [10.1145/3406111](https://doi.org/10.1145/3406111)

Saldaña, J. (2013). *The coding manual for qualitative researchers*. Thousand Oaks, CA: Sage.

Saltzman, L. Y., Solomyak, L., & Pat-Horenczyk, R. (2017). Addressing the needs of children and youth in the context of war and terrorism: The technological frontier. *Current psychiatry reports*, 19(6), 30. doi: 10.1007/s11920-017-0786-6

Sanders, R. L., & Rhodes, G. S. (2007). A simulation learning approach to training first responders for radiological emergence. In *Proceedings of the 2007 Summer Computer Simulation Conference, San Diego, California*. doi: 10.1145/1357910.1358134

Schatzki, T. R. (2001). Introduction: Practice theory. In T. R. Schatzki, K. Knorr Cetina, & E. von Savigny (Eds.), *The practice turn in contemporary theory* (pp. 1–14). London, England: Routledge.

Schell, J. (2014). *The Art of Game Design: A Book of Lenses*. 2nd ed. Morgan Kaufmann, Boca Raton.

Schlosberg, D., Della Bosca, H., & Craven, L. (2020). Disaster, Place, and Justice: Experiencing the Disruption of Shock Events. In *Natural Hazards and Disaster Justice*, 239-259. Palgrave Macmillan, Singapore.

Schnirring, L. (2020). WHO: Europe now world's COVID-19 epicenter, Retrieved from: <https://www.cidrap.umn.edu/news-perspective/2020/03/who-europe-now-worlds-covid-19-epicenter>. Accessed January 17, 2020.

Seddighi, H., Yousefzadeh, S., López, M. L., & Sajjadi, H. (2020). Preparing children for climate-related disasters. *BMJ Paediatrics Open*, 4(1). doi: 10.1136/bmjpo-2020-000833

Semaan, B. & Mark, G. (2012). "Facebooking" towards crisis recovery and beyond: disruption as an opportunity. In *Proceedings of CSCW 2012*, 27–36. doi: 10.1145/2145204.2145214

Semaan, B. C., Britton, L. M., & Dosono, B. (2016). Transition Resilience with ICTs: 'Identity Awareness' in Veteran Re-Integration. In *Proceedings of the 2016 CHI Conference on human factors in computing systems* (pp. 2882-2894). doi: 10.1145/2858036.2858109

Semaan, B., & Mark, G. (2011). Technology-mediated social arrangements to resolve breakdowns in infrastructure during ongoing disruption. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 18(4), 1-21. doi: 10.1145/2063231.2063235

Shahid, F., Ony, S. H., Albi, T. R., Chellappan, S., Vashistha, A., & Islam, A. A. A. (2020). Learning from Tweets: Opportunities and Challenges to Inform Policy Making During Dengue Epidemic. *Proceedings of the ACM on Human-Computer Interaction*, 4(CSCW1), 1-27. doi: 10.1145/3392875

Sharma, S., Devreaux, P., Scribner, D., Grynovicki, J., & Grazaitis, P. (2017). Megacity: a collaborative virtual reality environment for emergency response, training, and decision making. *Electronic Imaging*, 2017(1), 70-77. doi: 10.2352/ISSN.2470-1173.2017.1

Shichtman, D. (2020). Using the Pandemic as a Case Study: Teaching Social and Ethical Issues. In *Proceedings of the 21st Annual Conference on Information Technology Education* (pp. 285-290). doi: 10.1145/3368308.3415390

Shohieb, S. M. (2018). CDMG: crises and disasters management game (video game to teach Arab children how to handle emergencies and crises). In *Proceedings of the 2018 7th International Conference on Software and Computer Applications*, 264-268. doi: 10.1145/3185089.3185147

- Shusterman, R. (2008). *Body Consciousness: A Philosophy of Mindfulness and Somaesthetics*. New York: Cambridge University Press.
- Sloan, R. J. S. (2015). Videogames as Remediated Memories: Commodified Nostalgia and Hyperreality in Far Cry 3: Blood Dragon and Gone Home. *Games and Culture*, 10(6), 525–550. doi: 10.1177/1555412014565641
- Smith, D. (2005). Through a glass darkly. In R.W. Perry & E.L. Quarantelli (Eds.), *What is a disaster: New answers to old questions* (pp. 292–307). Philadelphia: Xlibris.
- Smyth, J. D., Dillman, D. A., Christian, L. M., & McBride, M. (2009). Open-ended questions in web surveys: Can increasing the size of answer boxes and providing extra verbal instructions improve response quality? *Public Opinion Quarterly*, 73(2), 325-337. doi: 10.1093/poq/nfp029
- Snodgrass, J. G., Lacy, M. G., Dengah, H. F., Eisenhauer, S., Batchelder, G., & Cookson, R. J. (2014). A vacation from your mind: Problematic online gaming is a stress response. *Computers in Human Behavior*, 38, 248–260. doi: 10.1016/j.chb.2014.06.004
- Soleimani, M., & Gharehbaglou, M. (2021). The role of self-determination needs and sense of home. *Journal of Housing and the Built Environment*, 1-24. doi: 10.1007/s10901-020-09804-x
- Southerton, D. (2006). Analysing the temporal organisation of daily life: Social constraints, practices and their allocation. *Sociology*, 40(3), 435–454. doi: 10.1177/0038038506063668
- Spinelli, M., Lionetti, F., Pastore, M., & Fasolo, M. (2020). Parents' stress and children's psychological problems in families facing the COVID-19 outbreak in Italy. *Frontiers in Psychology*, 11, 1713. doi: 10.3389/fpsyg.2020.01713
- St. Denis, L. A., Hughes, A. L., & Palen, L. (2012). Trial by fire: The deployment of trusted digital volunteers in the 2011 Shadow Lake Fire. *Proceedings of ISCRAM*.
- Starbird, K., & Palen, L. (2011). "Voluntweeters" self-organizing by digital volunteers in times of crisis. In *Proceedings of the SIGCHI conference on human factors in computing systems*, 1071-1080. Doi: [10.1145/1978942.1979102](https://doi.org/10.1145/1978942.1979102)

- Stephen, B. (2020). This is Twitch's moment. Retrieved from <https://www.theverge.com/2020/3/18/21185114/twitchyoutube-livestreaming-streamelements-coronavirusquarantine-viewership-numbers>. Accessed January 18, 2021.
- Stephenson, R., & Anderson, P. S. (1997). Disasters and the information technology revolution. *Disasters*, 21(4), 305-334. doi: 10.1111/1467-7717.00065.
- Stiso, M. E., Eide, A. W., & Pultier, A. (2015). A foray into the use of serious games in controlled research on crisis management. In *Proceedings of the ISCRAM 2015 Conference*.
- Sudarmilah, E., Wahab, I. H. A., Putri, D. A. P., Pratisti, W. D., & Yuliana, I. (2019). Game Education of Disaster Mitigation: A Systematic Literature Review. *International Journal of Advanced Trends in Computer Science and Engineering*, 8(6), 2940-2943. doi: 10.30534/ijatcse/2019/42862019
- Taha, S. A., Matheson, K., & Anisman, H. (2014). H1N1 was not all that scary: Uncertainty and stressor appraisals predict anxiety related to a coming viral threat. *Stress and Health*, 30, 149–157. doi: 10.1002/smi.2505
- Thakkar, D., Kumar, N., & Sambasivan, N. (2020). Beyond the portal: reimagining the post-pandemic future of work. *Interactions*, 27(6), 80-83. doi: 10.1145/3424676
- Toups, Z. O., Hamilton, W. A., & Alharthi, S. A. (2016). Playing at planning: Game design patterns from disaster response practice. In *Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play*, 362-375. doi: 10.1145/2967934.2968089
- Toups, Z. O., Hamilton, W. A., Keyes-Garcia, C., Perez, S. & Stanton, R. (2015). Collaborative Planning Gameplay from Disaster Response Practice. In *Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play (CHI PLAY '15)*, 715–720. doi: 10.1145/2793107.2810287
- Tsai, M. H., Chang, Y. L., Kao, C., & Kang, S. C. (2015). The effectiveness of a flood protection computer game for disaster education. *Visualization in Engineering*, 3(1), 1-13. doi: 10.1186/s40327-015-0021-7
- Tuan, Y. (1980). Rootedness versus Sense of Place. *Landscape*, 24, 3–8.

- Tyack, A., Wyeth, P., & Johnson, D. (2020). Restorative Play: Videogames Improve Player Wellbeing After a Need-Frustrating Event. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20)*, 1–15. doi: 10.1145/3313831.3376332
- van Gennip, D., van den Hoven, E., & Markopoulos, P. (2015). Things that make us reminisce: Everyday memory cues as opportunities for interaction design. In *Proceedings of the CHI 2015 Conference on Human Factors in Computing Systems*, 3443-3452. doi: 10.1145/2702123.2702460
- Vella, K., Johnson, D., & Mitchell, J. (2016). Playing Support: Social Connectedness Amongst Male Videogame Players. In *Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts* (pp. 343-350). doi: 10.1145/2968120.2987734
- Viana, R. B., & de Lira, C. A. B. (2020). Exergames as coping strategies for anxiety disorders during the COVID-19 quarantine period. *Games for health journal*, 9(3), 147-149. doi: 10.1089/g4h.2020.0060
- Vieweg, S., Palen, L., Liu, S. B., Hughes, A. L., & Sutton, J. (2008). Collective Intelligence in Disaster: Examination of the Phenomenon in the Aftermath of the 2007 Virginia Tech Shooting. In *Proceedings of the 5th International ISCRAM Conference, Washington DC, USA, May 2008*.
- Wallace, R. (2020). *Dead epidemiologists*. New York: Monthly Review Press.
- Wannigamage, D., Barlow, M., Lakshika, E., & Kasmarik, K. (2020). Analysis and Prediction of Player Population Changes in Digital Games During the COVID-19 Pandemic. In *Australasian Joint Conference on Artificial Intelligence* (pp. 458-469). Springer, Cham. doi: 10.1007/978-3-030-64984-5_36
- Ward, M. K., & Meade, A. W. (2018). Applying social psychology to prevent careless responding during online surveys. *Applied Psychology*, 67(2), 231-263. doi: 10.1111/apps.12118
- Warmelink, H., Mayer, I., Weber, J., Heijligers, B., Haggis, M., Peters, E., & Louwerse, M. (2017). AMELIO: Evaluating the team-building potential of a mixed reality escape room game. In *Extended abstracts publication of the annual symposium on computer-human interaction in play*, 111-123. doi: 10.1145/3130859.3131436

- WHO. (2020). Coronavirus disease (COVID-19): How is it transmitted? Retrieved from <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-covid-19-how-is-it-transmitted>. Accessed January 17, 2020.
- Williams, D. (2006). *A Brief Social History of Game Play*. In P. Vorderer & J. Bryant (Eds.), *Playing video games: Motives, responses, and consequences* (p. 197–212). Lawrence Erlbaum Associates Publishers.
- Wu, Y.C., Chen, C.S., & Chan, Y.J. (2020). The outbreak of COVID-19: An overview. *Journal of the Chinese Medical Association*, 83(3), 217–220. doi: 10.1097/JCMA.0000000000000270
- Wuertz, J., Alharthi, S. A., Hamilton, W. A., Bateman, S., Gutwin, C., Tang, A., ... & Hammer, J. (2018). A design framework for awareness cues in distributed multiplayer games. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (pp. 1-14). doi: 10.1145/3173574.3173817
- Wulf, T., Bowman, N. D., Velez, J. A., & Breuer, J. (2018). Once Upon a Game: Exploring Video Game Nostalgia and Its Impact on Well-Being. *Psychology of Popular Media Culture*, 9(1). doi: 10.1037/ppm0000208
- Yardley, L. (2000). Dilemmas in qualitative research. *Psychology & Health*, 15, 215–228. doi: 10.1080/08870440008400302.
- Yaya, S., Uthman, O. A., Agbessi, A., & Ghose, B. (2018). Mass media exposure and its impact on malaria prevention behaviour among adult women in sub-Saharan Africa: results from malaria indicator surveys. *Global Health Research and Policy*, 3(20). doi: 10.1186/s41256-018-0075-x
- Yuan, Y., Cao, J., Wang, R., & Yarosh, S. (2021). Tabletop Games in the Age of Remote Collaboration: Design Opportunities for a Socially Connected Game Experience. *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, 1–14. doi: 10.1145/3411764.3445512
- Zhang, R., Bazarova, N., and Reddy, M. (2021). Distress Disclosure across Social Media Platforms during the COVID-19 Pandemic: Untangling the Effects of Platforms, Affordances, and Audiences. *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, 1–15, doi:10.1145/3411764.3445134

Zhang, X., Gui, X., Kou, Y., & Li, Y. (2020). Mobile Collocated Gaming: Collaborative Play and Meaning-Making on a University Campus. *Proceedings of the ACM on Human-Computer Interaction*, 4(CSCW2), 1-24. doi: 10.1145/3415213

Zhu, L. (2020). The psychology behind video games during COVID-19 pandemic: A case study of Animal Crossing: New Horizons. *Human Behavior and Emerging Technologies*, 3(1), 157-159. doi: 10.1002/hbe2.221

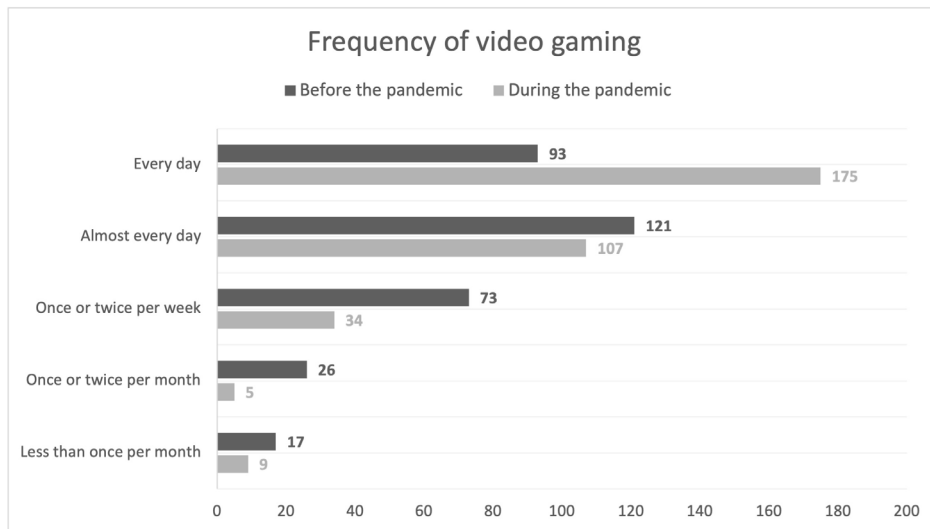


Figure 1. Frequency of play before and during the pandemic

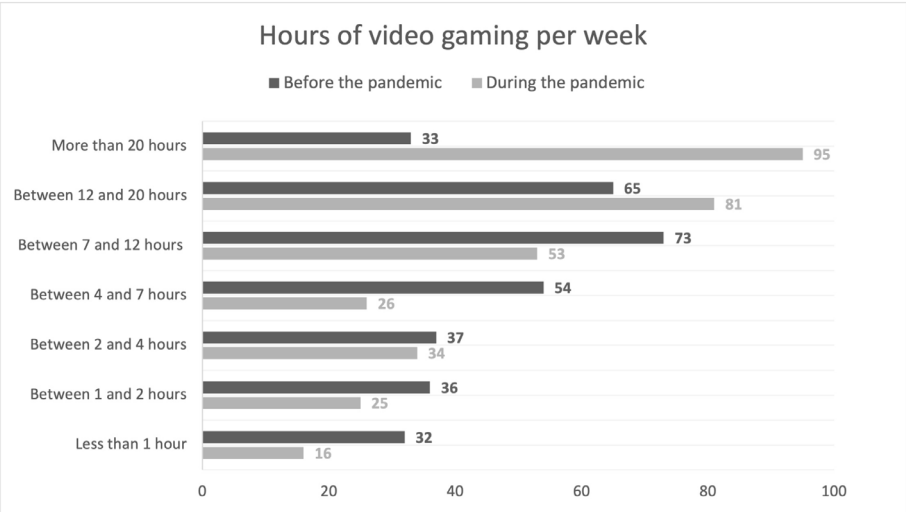


Figure 2. Duration of play before and during the pandemic

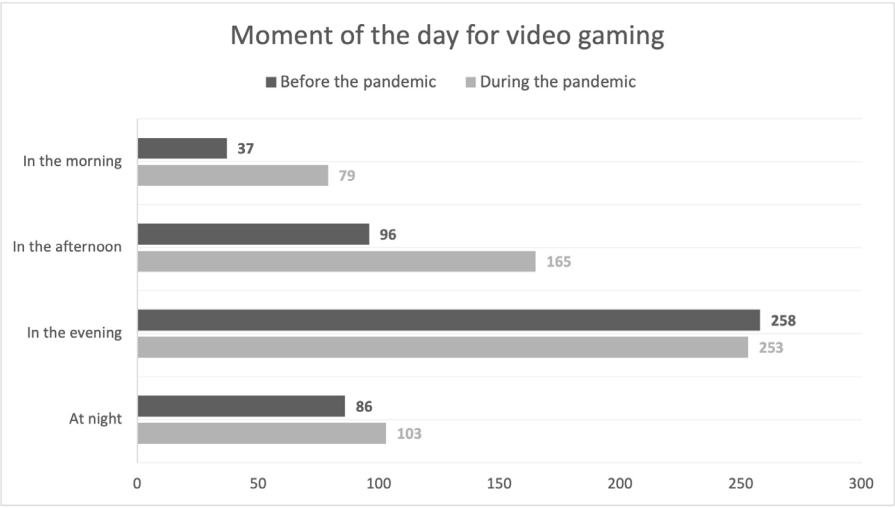


Figure 3. Moment of the day for playing before and during the pandemic

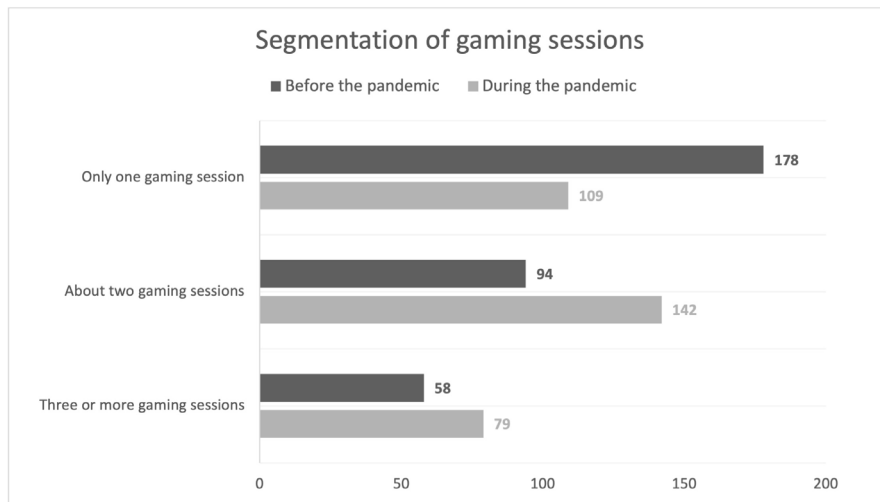


Figure 4. Segmentation of gaming sessions before and during the pandemic

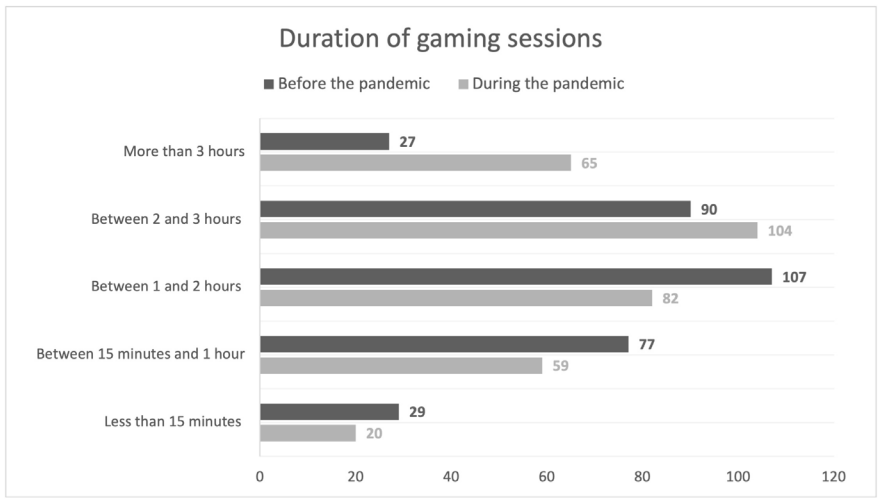


Figure 5. Duration of gaming sessions before and during the pandemic

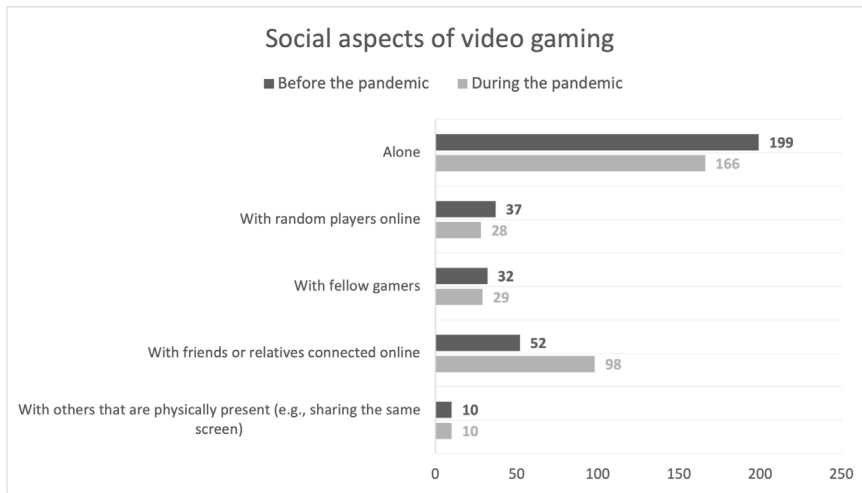


Figure 6. Usual modalities of social playing before and during the pandemic

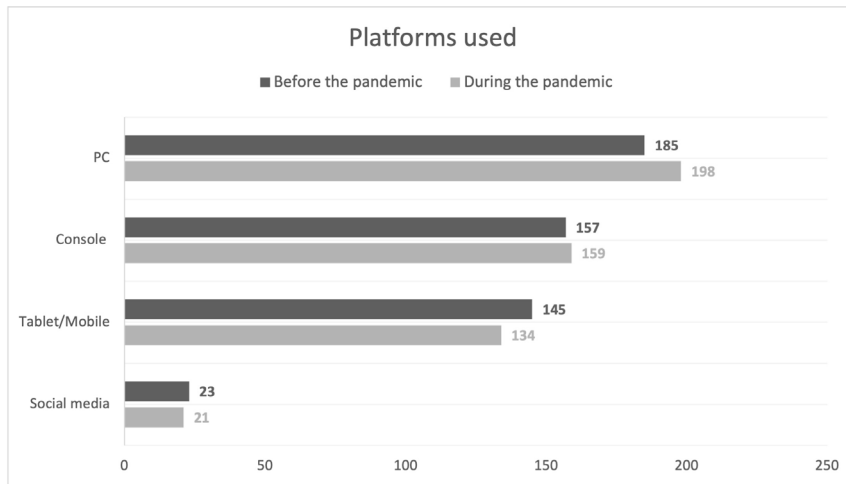


Figure 7. Platforms used before and during the pandemic

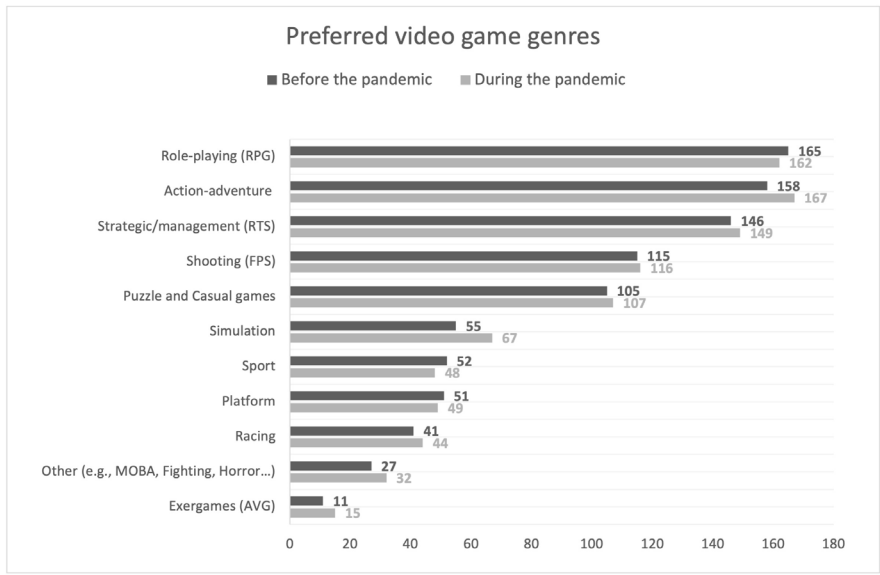


Figure 8. Preferred video game genres before and during the pandemic

Table 1 – Key findings

Dimension	What participants experienced during the lockdown	Video game usage during lockdown	Side effects
Dealing with a new temporality	<ul style="list-style-type: none"> - Slow moving and boring time - Repetitive and empty time - Difficulty to manage time and time as suspended 	<ul style="list-style-type: none"> - The goals offered by video games sped up the experience of time - The stimuli provided by playing made time more meaningful - Having specific times for playing enabled the reconstruction of temporal routines 	<p>Temporal escape in video games could yield:</p> <ul style="list-style-type: none"> - Disruption of temporal routines - Perception of playing time as meaningless
Managing “stressful” emotions	<ul style="list-style-type: none"> - Tension-related emotions, characterized by overthinking and inquietude - Fear and the sensation of being in danger - Gloomy feelings, like sadness and emotional flatness 	<ul style="list-style-type: none"> - The objectives and immersion provided by video games had the players focus their attention and elicited the experience of lighter emotions - The rules of the video game supported experiences of control and sense of security - The mental and physical stimulation elicited by video games enhanced emotional states 	<p>Emotional escape in video games could yield:</p> <ul style="list-style-type: none"> - drain of energy, as if it were a work - exacerbation of feelings of worthlessness and excessive sensitivity to in-game events
Reworking social relations and interactions	<ul style="list-style-type: none"> - Poor and monotone co-located interactions - Forced cohabitation - Separation from loved ones and the “other” as a danger 	<ul style="list-style-type: none"> - Video games provided variety to co-located interactions - Immersion in video games opened opportunities to self-isolate from others - Social features of video games enabled the sharing of experiences and the recovering of a safe sociality 	<ul style="list-style-type: none"> - Social escape induced by playing could be detrimental for household relationships - Attempts to preserve household relationships may negatively affect daily routines
Finding new “places” to inhabit	<ul style="list-style-type: none"> - Home as oppressive - The world as uncertain, dangerous, and unfamiliar 	<ul style="list-style-type: none"> - Video game spaces allowed “traveling” and reconnection to the pre-pandemic world - Video game spaces were freely shapeable worlds, allowing the recovery of a sense of security and the feeling of being at “home” 	<ul style="list-style-type: none"> - The spatial escape into virtual environments could increase the players’ sedentariness

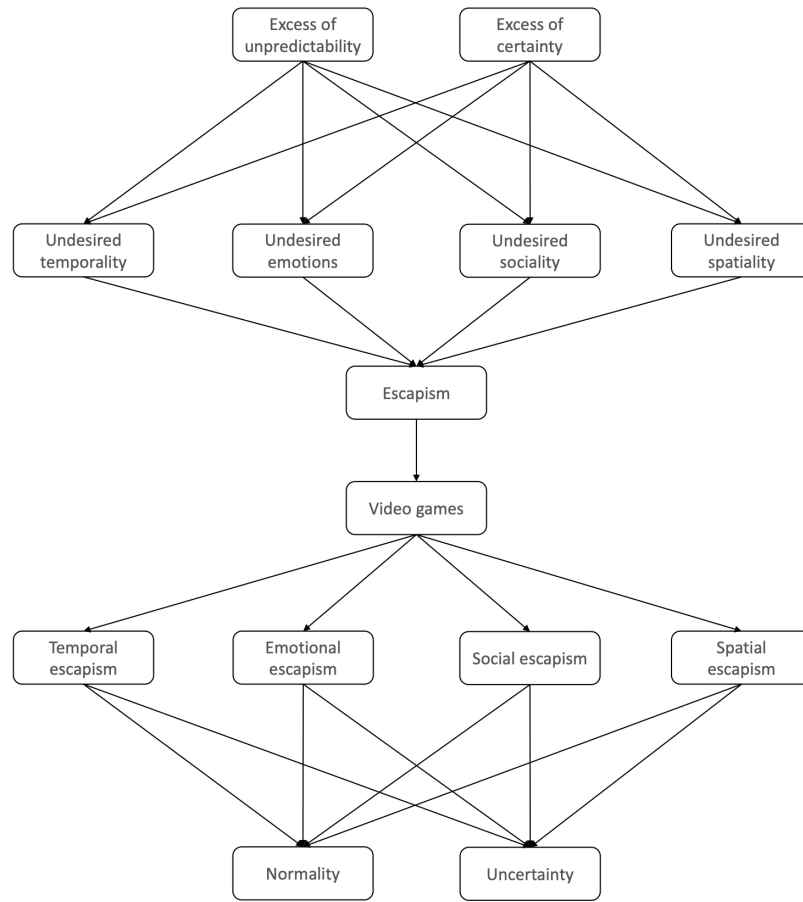


Figure 9. A model of escapism in the context of crises