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Games Matter? Current Theories and Studies on Digital Games

Editors

Julia Kneer and Ruud Jacobs

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Games Matter? Current Theories and Studies on Digital Games

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Editorial

Grow Up, Level Up, and Game On; Evolving Games Research

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Abstract

Playing host to articles written in different disciplines and perspectives on the shared subject of digital gaming, the current thematic issue means to galvanise interest in and recognition of the nascent field of games research. Despite being little more than 50 years old, the medium of digital games has seen a meteoric rise to economic and cultural prominence across the globe. A cultural shift accepting games as a worthwhile recreational activity (and more) is likewise resulting in shifting attentions within game studies. Games were seen as frivolous and even harmful, and research traditionally focused on the negative effects they were perceived to have while in the end coming up with very little reliable evidence to support this position. The current wave of games research exemplified in this issue is certainly wider: games are a cultural and often highly socialised medium that has changed the way we view the world. They are used in non-entertainment settings, helping to promote active learning in players of all ages. The medium also facilitates deeper psychological and philosophical theorizing, as researchers grapple with deeper questions on what games and play mean to each of us. Put simply: games research is not just fun and games.

Keywords

culture; digital games; effects; serious games; social panic

Issue

This editorial is part of the issue “Games Matter? Current Theories and Studies on Digital Games”, edited by Julia Kneer (Erasmus University Rotterdam, The Netherlands) and Ruud Jacobs (University of Twente, The Netherlands).

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1. Introduction

This thematic issue gives an overview of the huge diversity of game studies in current research on games. Game studies might still be considered a relatively new scientific field, including perspectives from psychology, communication research, media science, philosophy, art, design, computer science and more. However, digital games themselves are not that new, dating back to 1962 with *SpaceWars!* being developed at MIT. In the early 1970s *Pong* (Atari, 1972), the first commercially available computer game, was designed and placed in public locations. With the launch of the Atari VCS video game console in 1977, game computers soon started coming into the homes of a new but quickly growing audience of players.

This growth has not yet stopped. The report of the Entertainment Software Association states that nowadays 67% of all US households own at least one device that is used to play digital games (Entertainment Software Association, 2017). In addition, digital games cannot be considered to be a leisure activity for young men only; the average player is actually 37 years old and women play as much as men do. Despite the rising numbers of players, games are still often perceived as a dangerous and negative new technological development by policy makers and non-gaming audiences. Research has picked up on this debate, resulting in an avalanche of studies revolving around possible detrimental effects (e.g., Elson & Ferguson, 2013; Ferguson, 2008; Ivory et al., 2015). Studies on a more general level consider this debate and the

ambivalent research results found as a generational conflict between younger and older societal groups (Ivory & Kalyanaraman, 2009; Kneer, Glock, Beskes, & Bente, 2012; Kneer, Munko, Glock, & Bente, 2012; Quandt, Chen, Mäyrä, & van Looy, 2014), both inside and outside of academia. These studies have one thing more or less in common: negative attitudes disappear with own playing experience and/or being part of the playing generation. Thus, some scientists are even expecting prejudice against games and players to be gone within the next generation, as there will hardly be anyone left who does not have first-hand playing experience. The results of the meta-analyses mentioned above showed that games simply cannot be said to unequivocally cause negative behavioural outcomes. Indeed, the demand to stop presenting digital games as cause for school shootings and other terrible events was supported by the US Supreme Court, which ruled in 2011 that there was no connection between violent games and real life aggression.

After all, no one plays games in order to *become* aggressive or addicted, or to develop any other negative tendencies. Thus, the academic discussion concerning games moved beyond the mere focus on negative effects games might or might *not* have and targets more and more the importance of digital games as part of daily life, including positive effects (e.g., Ferguson, 2007; Reinecke, Klatt, & Krämer, 2011; Rieger, Frischlich, Wulf, Bente, & Kneer, 2014), motivations for game play (e.g., Przybylski, Weinstein, Murayama, Lynch, & Ryan, 2012; Tamborini, Bowman, Eden, Grizzard, & Organ, 2010), and persuasive effects (Jacobs, 2016), among others.

Nevertheless, researchers that are studying a medium that is just over half a century old and still developing at an accelerating pace are not always taken that seriously. Some who see digital games as a purely youth-oriented leisure activity might question if games research is even necessary at all. Who is a player after all?

In fact, looking at the constantly rising numbers coming from the game industry (Entertainment Software Association, 2017), it can be concluded that digital games have become an indispensable part of human life—for younger *and* older generations. The stereotype about game researchers doing this research because they are players themselves will start to fade, and the question ‘who is a player after all?’ will be replaced by the question ‘who is not a player after all?’.

The contributions to this thematic issue grapple with the maturation of games in society in three ways. First, the contributions take a broad cultural perspective, discussing games as fondly remembered pastimes, social glue, and artistic expression. Second, we take a closer look at *serious games*, those games that have been designed to offer experiences beyond entertainment. The last two contributions open up the fabric of games, discussing how they make us think (about them) and how we as researchers should view them.

Many young and middle aged adults remember playing digital games such as *Pong*, *Pacman*, *Mario Kart*

(Atari, 1972, Namco, 1980, and Nintendo, 1992, respectively) and others in their youth, creating feelings of *nostalgia*. As these adults attribute meaning to their time spent gaming all those years ago, the first article of this thematic issue from Wulf, Bowman, Rieger, Velez and Breuer (2018) explains how digital games are able to induce nostalgic feelings and how these feelings are related to well-being of players.

If digital games are able to create feelings of nostalgia, we have to consider them as a cultural part of our lives. Do you maybe remember going to Arcade Game halls yourself or meeting up with friends for all-night LAN parties? If so, you already know that games can create social events (Jansz & Martens, 2005). Thus, the stereotype of the lonely male child that sits in the basement and plays digital games alone disappears slowly, and is replaced by the idea of *games as cultural good*. In the second article of this issue, Love (2018) explores social game events and how participating is necessary to understand games as culture not only for researchers but for game designers as well. That game cultures might even have the power to shift national and global boundaries is analysed by Elmezeny and Wimmer (2018). The third piece on games as culture from Szabo (2018) presents Psychasthenia Studio, an interdisciplinary art collective, as another paradigm. Their working process demonstrates how digital games go beyond straightforward entertainment or communication and can be a medium of (artistic) expression.

Despite the idea of games as cultural good, one might argue that digital games are nothing new. They would say digital games are just games packaged in a new technological form. The idea of (any) games being important for human well-being and society is indeed well-known since the beginning of mankind. Some might even state that digital games are just a (new) form of distraction from real life and from societal problems, pointing back to the idea of ‘panem et circenses’ (bread and games) in Ancient Rome. However, games are nowadays not only used for entertainment and distraction but also offer deeper socio-political meaning. Two papers coming from the research topic of *Serious Games* are targeting exactly this idea: if and how games can be used for persuasion and learning (Jacobs, Jansz, & de la Hera Conde-Pumpido, 2017). While de la Hera Conde-Pumpido (2018) explores the impact of cancer games and shows the positive output beyond persuasion, Hébert, Jenson and Fong (2018) give insight in the complexity of measuring learning effects of games via one case study.

In the final parts of this issue we turn our perspective inward. By their design, games consist of rules, systems, and interactions. Those interactions are made possible by the way we as players think how the game works. The seventh article in this thematic issue by McGloin, Wasserman and Boyan (2018) discusses these thoughts as mental models. After describing how the more fundamental conception of mental models works with the technical, mediated, and procedural aspects of games,

they show how this way of thinking can transform effects research on this medium. In addition, Willumsen (2018) gives an insight how formalism and formal analyses can be used to study games coming from a philosophical point of view.

Hence, this thematic issue is organized according to these perspectives:

A. Do You Remember?

“Video Games as Time Machines: Video Game Nostalgia and the Success of Retro Gaming” (Wulf et al., 2018).

B. Games as Cultural Good

“Do We Need Permission to Play in Public? The Design of Participation for Social Play Video Games at Play Parties and ‘Alternative’ Games Festivals” (Love, 2018);

“Games without Frontiers: A Framework for Analysing Digital Game Cultures Comparatively” (Elmezeny & Wimmer, 2018);

“Psychasthenia Studio and the Gamification of Contemporary Culture” (Szabo, 2018).

C. Serious Games

“The Persuasive Roles of Digital Games: The Case of Cancer Games” (de la Hera Conde-Pumpido, 2018);

“Challenges with Measuring Learning through Digital Game Play in K-12 Classrooms” (Hébert et al., 2018).

D. Behind Games Research: Theory and Method

“Model Matching Theory: A Framework for Examining the Alignment between Game Mechanics and Mental Models” (McGloin et al., 2018);

“The Form of Game Formalism” (Willumsen, 2018).

This thematic issue hopes to give a blanket answer to the perennial question game researchers are asked: ‘So you play games all day?’ We hope that we could provide an insight into what is *really* going on behind the curtains of game research and that our thematic issue can show you that games do matter after all. It is important to have an idea how games are researched, how games contribute to well-being and research itself, and which research methods are adequate in the study of games. Now that it is clear that moral panic will not help to understand the phenomenon of digital games, it is time to

accept games as an integral part of modern life. To sum up, game on!

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Conflict of Interests

The authors declare no conflict of interests.

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Article

Video Games as Time Machines: Video Game Nostalgia and the Success of Retro Gaming

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Abstract

This article conceptually integrates research on the experience of nostalgia—defined as a predominantly positive, social, and past-oriented emotion—into the fold of video game research. We emphasize the role of nostalgia as an explanation for contemporary retro gaming trends, and suggest that nostalgia towards gaming events is a necessary area of research. To those ends, we broadly review existing literature on nostalgia before specifically focusing on media-induced nostalgia, and demonstrate how theoretical and empirical observations from this work can be applied to understand video game nostalgia. In particular, we argue that engaging in older gaming experiences indirectly (via memories) and even directly (via replaying or recreating experiences) elicits nostalgia, which in turn contributes to players' self-optimization and enhanced well-being. Moreover, as gamers and the medium mature together, nostalgic experiences with the medium are likely to become increasingly prevalent. The broad aim of this article is to offer future directions for research on video game nostalgia and provide a research agenda for research in this area.

Keywords

entertainment; nostalgia; retro gaming; video games; well-being

Issue

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1. Video Games as Time Machines: Video Game Nostalgia and the Success of Retro Gaming

The emergence of the video gaming industry in the 1980s has provided modern-day video gamers with over three decades of experience with the medium. From the Nintendo Entertainment System of 1984 that is largely credited with re-establishing the fledgling entertainment

medium, games have gone through a number of critical, economic, and technological evolutions that have transformed them from children's toys (Ivory, 2015) to an integral part of society (Bogost, 2011).

Perhaps unsurprisingly then, retro gaming is a recent phenomenon in video game culture—gamers are starting to return to their initial and past experiences with games. Typically, retro gaming describes playing and col-

lecting old video games and consoles, although it can also include playing modern games with a “retro” style, such as using older graphics and audio mechanics. Especially over the last few years, video game developers have successfully relaunched a plethora of past video game content and technology. For instance, in 2016 with *Pokémon Go*, Nintendo launched the third most popular smartphone application of the year (Bell, 2016). The re-release of the Nintendo Entertainment System Classic Edition more than 30 years after its first appearance in the 1980s met with similar critical and commercial success, selling out mere hours after its release (Peckham, 2016). Pubs and taverns have begun setting up retro-style arcade machines, giving patrons the possibility to enjoy their beer with a game of *Pac-Man* or *Pong* (Axelrod, 2015).¹ Developers have even taken towards releasing unique games made to resemble 1980s and 1990s releases (Webster, 2017).

What makes these developments particularly interesting is that the renewed interest represents a devolution in gaming—despite the rapid advances in technology and the playing experiences modern games offer, people choose technologically inferior or less sophisticated games and platforms. Such a preference is at odds with the traditional push towards better graphics and faster hardware.²

One explanation for the recent success of retro gaming is that it creates a sense of nostalgia, which can serve as a psychological resource for the players’ sense of self and well-being—in a way, retro gaming allows players to take a digital “time machine” to their bygone past. In the following, we (a) summarize the state of nostalgia research (including recent studies on video game nostalgia, specifically) and (b) outline a conceptual and methodological toolkit for future work on video game nostalgia.

2. Nostalgia

After reflecting on meaningful and self-referential past events, people will wallow in their memories and enter an emotional state that contains both positive emotions (warmth, tenderness, joy, elation) and negative emotions (loss, fear, sadness; Barrett et al., 2010). This mixed-affective state is *nostalgia*. Hepper, Ritchie, Sedikides and Wildschut (2012) found that characteristics of nostalgia most commonly include references to bygone events from the past. More specifically, emergent features included *memories, the past, personal meaning, yearning or longing, social relationships, happiness, and childhood*. Follow-up work (Hepper et al., 2014) substantiated these findings for various cultures. Summarizing this research, Sedikides et al. (2015b) define nostalgia as a “predominantly positive, social, and past-oriented emotion” (p. 198).

Research has found two types of triggers for nostalgia. The first type occurs externally through sensory stimuli in one’s environment that remind people of their past. This has been demonstrated for smells (Reid, Green, Wildschut, & Sedikides, 2014), tastes (Supski, 2013), different objects (often childhood-related; Holbrook & Schindler, 1996) and music (Cheung et al., 2013; Routledge et al., 2011). The second type occurs internally and typically arises from feelings of psychological discomfort. For instance, if people feel lonely (Wildschut, Sedikides, Arndt, & Routledge, 2006), meaningless (Routledge, Wildschut, Sedikides, Juhl, & Arndt, 2012), or bored (van Tilburg, Igou, & Sedikides, 2013), they may turn their thoughts towards the past to cope with this discomfort.

2.1. Video Games and Nostalgia

Research on the potential of media stimuli to trigger nostalgia has found that trailers of video games and movies may hold the potential to make people feel nostalgic (Natterer, 2014). Wulf and Rieger (2017) found evidence that the parasocial relationships that viewers establish with on-screen media personae (cf. Horton & Wohl, 1956) lead to increased feelings of nostalgia when people remember past media content. Studies looking at the popular augmented reality mobile game *Pokémon Go* found that playing the game showed positive associations with nostalgic reverie (Bonus, Peebles, Mares, & Sarmiento, 2017). Indeed, Wulf and Baldwin (2018) found *personal meaningfulness* of the Pokémon franchise to have the strongest associations with nostalgia, even more so than trait nostalgia proneness; nostalgia in turn increased intentions to play the game. *Pokémon Go* is an interesting case for video game nostalgia. While it had the same basic “catch ‘em all” mechanic which encouraged players to collect Pokémon as the original *Pokémon* (released in 1996), the original took place in the fictitious “Kanto region” (with its own unique characters and narrative) while the latter was played in an augmented reality format (using the player’s own environment). Thus, Wulf and Baldwin (2018) suggest that nostalgia can be invoked by engaging elements of a game or franchise, and does not require an exact reproduction of the original game.

In an exploratory study on video game nostalgia, Wulf, Breuer, Bowman and Velez (2017) asked participants to recall enjoyable gaming experiences, randomly assigning them to recall (via an essay prompt) either past or recent gaming experiences that they had either alone or together with others. Additionally, participants had to estimate how autonomous, competent, and socially related they had felt when playing these games—measures of intrinsic need satisfaction critical to enjoyable gaming

¹ This is in a way reminiscent of the original arcade machines—the first *Pong* arcade was installed in Sunnyvale, California, in a tab called Andy Capp’s tavern 1972 (Kent, 2001).

² A prominent example from recent gaming history are the so-called “bit wars” of the 1990s in which game manufacturers challenged each other to develop more powerful consoles, usually measured by the number of bits (graphics detail) and colors displayed on-screen (cf. Workman, 2014).

experiences (cf. Tamborini, Bowman, Eden, Grizzard, & Organ, 2010). They found that nostalgia was positively associated with the fulfilment of competence (directly) and relatedness (influenced by social play) within the memory. Moreover, qualitative analyses of the essays written by participants found that past video game memories were more often associated with childhood, challenge, and overall (hedonic) media enjoyment compared to recent essays. Taken together, these findings suggest that simply remembering gaming experiences can create nostalgia and that competence and relatedness fulfillments within memory connect to nostalgic reverie.

2.2. Nostalgia as a Self-Related Emotion

In his self-discrepancy theory, Higgins (1987) differentiates between the *actual self*—“your representation of the attributes that someone (yourself or another) believes you actually possess” (p. 320)—and the *ideal self*—“your representation of the attributes that someone (yourself or another) would like you, ideally, to possess” (p. 321). When comparing their actual and ideal self, people may feel a discomfort that motivates them to reduce the gap between these entities. In general, how people remember and evaluate past life events impacts how they see themselves—people tend to self-enhance by remembering positive past life events, and turn away from past selves which they associate with negative life events (Wilson & Ross, 2003).

Nostalgia can serve to orient people closer to their ideal self. In this way, feelings of nostalgia seems to serve a “self-oriented function” (Sedikides et al., 2015b, p. 209). Research has demonstrated that when instructed to elaborate on a *nostalgic* life event (compared to an *ordinary* event), people showed higher accessibility of positive self-attributes (Vess, Arndt, Routledge, Sedikides, & Wildschut, 2012). Moreover, this accessibility to positive attributes also braced nostalgic people for subsequent self-threats (negative performance feedback in this study). Also, Baldwin, Biernat and Landau (2015) showed that participants remembering nostalgic experiences showed higher intrinsic self-focus, lower extrinsic self-focus, and perceived themselves as more authentic than participants who remembered an ordinary event. Finally, nostalgia also fosters self-acceptance by enhancing self-positivity (Vess et al., 2012) and personal growth via self-expansion and curiosity (Baldwin & Landau, 2014). These findings suggest that nostalgia not only provides people with an overall positive evaluation of themselves, but also encourages reflection on inner values and personality.

Finally, nostalgia contributes to self-continuity, “a sense of connection between one’s past and one’s present” (Sedikides et al., 2016, p. 524). As self-continuity involves perpetual self-development, nostalgia fosters self-continuity that in turn restores self-esteem (Sedikides, Wildschut, Routledge, & Arndt, 2015a). Thus, by remembering meaningful past experiences, people

sense that their life has a common thread. All these studies combined suggest that nostalgia functions as a resource for the self.

2.3. Video Games and Self-Relations

Playing video games may have an impact on how people see and identify themselves. Video games exist as media properties that defined a generation (Carstens & Beck, 2004) and as such, their images are iconic with a by-gone era of classic gaming (Hörtnagl, 2016). Given that the average gamer is in their mid-1930s and has been playing for nearly two decades (Entertainment Software Association, 2016), a large segment of the gaming market is comprised of people who have grown up with technologies popular in their youth (Heineman, 2014). Scholars such as Durkin (2006) argued that by the end of the 20th century, video games had become a ubiquitous social and cultural touchstone in a normal childhood development. Moreover, gamers defend their social identity as “gamers” from negative stereotypes of gamers (Kneer, Munko, Glock, & Bente, 2012; Nauroth, Gollwitzer, Bender, & Rothmund, 2015), and retro gaming fans constitute an even more nuanced gamer identity (Suominen, 2008).

A critical element of nostalgia and self-identity is that one can also tap media products that influenced past identities (or influenced previous versions of one’s identity). Similar work on nostalgia elicited by song lyrics suggests that listeners who find nostalgic meaning in songs were more likely to explore their identity (Batcho, DaRin, Nave, & Yaworsky, 2008). Specifically, “an essential dimension of nostalgic sentiment is the awareness that the object of nostalgic longing is gone forever, trapped in a past that cannot be again” (p. 240). This is highly relevant for nostalgia as elicited by video games, as people still can play the referent nostalgic products. In contrast to songs that allow an acoustic journey to the past, video games allow people to return with more than the aural sense, namely visual and, in the case of past gaming controls, haptic sense. Hence, by engaging older games people can essentially return to the exact same virtual space that they explored in earlier times, which might “constitute an identity for themselves that is grounded in nostalgia, expertise, and an agonistic relationship to the modern games industry” (Heineman, 2014, p. 19). Retro gaming therefore allows gamers to revisit and maintain their gamer identity.

Finally, applying nostalgia’s self-oriented function to video games, people who have had positive playing experiences might use these memories for actual self-enhancement and maintaining positive self-views. Nostalgia emerging from re-experiencing these games might also come with a particular kind of meaningfulness. For instance:

Two friends playing a game together that they often played together as children might provide an enter-

tainment experience that differed in its meaningfulness compared to other games played at other times with other friends. (Elson, Breuer, Ivory, & Quandt, 2014, p. 535)

Such situations represent (self-)continuity in the players' lives in three different regards: First, the game itself appears as a steady, persistent component in both players' lives over time. Second, the situation portrays a playing experience together with a closely related person and therefore, playing the game mirrors the stable and ongoing friendship between these people. Finally, the fact that these two people enjoy playing the same game now that they often played as children also refers to the fact that their preferences for video games (or leisure time activities, globally) have not substantially changed over time.

2.4. Video Game Nostalgia and Well-Being

Research has commonly sought an explanation for those variables crucial for living a good and happy life. One group argues a good life is that of people who experience a lot of positive affect (pleasure and joy) and a minimum of negative affect (discontent and sadness). This view is defined as *subjective well-being* (cf. Diener, Emmons, Larsen, & Griffin, 1985; Kahneman, Diener, & Schwarz, 1999). A second perspective builds upon Aristotle's approach in his *Nicomachean Ethics* and focusses on the assumption that one has to live according to their true self—people who realize their inner goals and ambitions achieve highest fulfillment and well-being (Waterman, 1993). Following this latter perspective, *psychological well-being* consists of components that emerge in people who live according to their self (Ryff & Keyes, 1995, p. 720). Notably, subjective and psychological well-being show significant positive correlations, indicating that both concepts relate to each other (cf. Keyes, Shmotkin, & Ryff, 2002).

With respect to subjective well-being, nostalgia has been found to counter aversive states such as negative affect (Barrett et al., 2010) and boredom (van Tilburg et al., 2013). Furthermore, by enhancing self-concept clarity ("the extent to which self-beliefs are clearly and confidently defined", Campbell et al., 1996, p. 141), nostalgia enhances overall life satisfaction (Ritchie, Sedikides, Wildschut, Arndt, & Gidron, 2011) and increases optimism for the future (Cheung et al., 2013). Regarding psychological well-being, nostalgia fosters purpose in life (Routledge et al., 2011), and positive relations with others due to its social nature, reminding people of their peers (Wildschut et al., 2006). Moreover, people coping with threats for psychological well-being use nostalgia as an antidote: It counters loneliness (Wildschut et al., 2006), social exclusion (Wildschut, Sedikides, Routledge, Arndt, & Cordaro, 2010), and restores a lack of meaning in life after existential threats (Juhl, Routledge, Arndt, Sedikides, & Wildschut, 2010). Altogether, nostal-

gia holds a variety of contributions to facilitate living a good, satisfied, and meaningful life.

Does remembering video game experiences and re-playing old or re-released video games elicit nostalgia in a way that contributes to well-being? Emerging studies show some evidence that video game nostalgia shows similar positive associations with well-being. Broadly, nostalgia triggered by remembering enjoyable video game experiences is positively connected with aspects of subjective well-being (vitality) as well as psychological well-being (social connectedness; Wulf et al., 2017). Two studies investigated how nostalgia triggered by playing *Pokémon Go* relates to particular well-being outcomes. Bonus et al. (2017) showing that playing *Pokémon Go* positively correlates with nostalgic reverie, which in turn contributes to resilience (defined as the ability to cope with setbacks in life), one dimension of well-being. Wulf and Baldwin (2018) showed that nostalgia triggered by playing *Pokémon Go* positively correlated with entertainment of the game, which boosted both subjective and psychological components of well-being.

Thus, we conclude that nostalgia can increase well-being through providing an overall entertaining gaming experience. Positive effects found for biographical nostalgia are therefore replicable in the video game context and point towards this area of research as potential venue for future research.

3. Venues for Future Research

Given the novelty of research on retro gaming and its psychological benefits, there is a variety of questions which future research could address. Below, we offer a discussion of promising venues that would benefit from understanding the motivations and effects of video game-induced nostalgia as well as a research agenda to investigate this emerging field.

First, the role of past technology (hardware, controllers, particular modules or discs) in the elicitation of nostalgia is still unclear (see Roth, Lugin, von Mammen, & Latoschik, 2017). Several studies imply that the content and (social) circumstances of past games make people nostalgic, and that perhaps the technology itself is secondary to the experience. They found relationships to characters (Wulf & Rieger, 2017), personal meaningfulness for the franchise (Wulf & Baldwin, 2018), positive psychological experiences as well as social associations while playing the game positively related to nostalgia (Wulf et al., 2017). However, if the specific technology (such as the console) is not critical for the elicitation of nostalgia, then why do people pay substantial amounts of money for a Nintendo Entertainment System Classic Edition—and even more for an original console—instead of paying a small fraction of the costs to play the same games in other formats (such as the eShop for Nintendo Wii)? One assumption could be that these *classic* consoles are able to represent part of people's identity, somewhat suggested by Suominen (2008).

While some people decorate their places with old photographs or share vintage style pictures on Instagram to express themselves (Niemeier, 2014; Sapio, 2014), others express their identity decorating their place with technological objects such as these classic consoles. Having these objects at home, owners and visitors may stop by, wallow in their (shared) gaming memories when seeing these artifacts, and become nostalgic as a result. To assess what role hardware plays for the experience of video game nostalgia, research is needed that presents participants with old or retro gaming hardware and, for example, compare the effects of playing old games on new versus old hardware or only interacting with the hardware (without playing a game).

Second, research needs more conceptualizing about the relationship between nostalgia and video game entertainment. Theoretically, nostalgia may contribute to several components of entertainment (Wulf & Schmitt, 2017). Generally, recent models of entertainment assume that there are two processes making video games, or media in general, entertaining (Vorderer, 2011): people experience *hedonic* entertainment as enjoyable, funny, lighthearted, or suspenseful. These experiences are opposed to *eudaimonic* or *non-hedonic* entertainment. These experiences are entertaining because of their potential to evoke critical thoughts and to question people's worldview, leaving the audience in a moved or pensive state (Oliver & Bartsch, 2010). Both of these experiences apply to video games (Oliver et al., 2015). We predict that nostalgia as a response to playing past-related video games may contribute to both of these experiences. First, nostalgia fosters hedonic experiences as people enjoy the playful time travel. Nostalgia is a predominantly positive emotion (Sedikides et al., 2015b) and *fond memories* as well as *happiness* belong to one of the central features identified (Hepper et al., 2012). Second, nostalgia contributes to eudaimonic entertainment. People might experience video game nostalgia as meaningful and feel moved by this experience. They also compare their present identity to the identity of the person they had been when playing that game earlier in their life. For those reasons, nostalgia theoretically connects to both hedonic and eudaimonic experiences.

Although there is some evidence for a positive relationship between nostalgia and entertainment in general (Wulf & Baldwin, 2018), future research needs to evaluate nostalgia's contribution to particular hedonic and eudaimonic entertainment. Such a focus could, for example, differentiate preferences for retro and present games, at both the state and more trait-based levels. For instance, recent conceptualizations of meaningful media focus on their potential to elicit self-transcendent emotions, such as gratitude (Dale et al., 2017; Oliver et al., in press). Feeling grateful of one's past or the possibility to reminiscence in past playing experiencing might be one of the reasons leading to positive nostalgic media experiences. In addition, while some prefer media usage for short-term fun and distraction, others prefer media expe-

riences that offers them some meaningful insight (Oliver & Raney, 2011). Research bridging the gap between entertainment preferences and actual retro gaming combined with research on nostalgia's contribution to entertainment might unveil the characteristics and the motives behind people using retro games.

Looking at challenges for research on video game nostalgia, one major problem is nostalgia's idiosyncratic nature. While Person A might become nostalgic listening to a particular song as it reminds her or him on a specific situation (for instance, the first kiss), for Person B the same exact song could (and probably does) signify something completely different. The same holds true for video game content and technology: though Person A and Person B both identify as gamers, who vary in their experience with games and franchises, one could imagine for example Person A having played games on a Super Nintendo but Person B having preferred playing the same or other games on a Sega Genesis. To account for this idiosyncratic nature of nostalgia, we recommend future research to use yoked designs: in a pretest, researchers ask participants for their childhood gaming experiences (which console and games was their favorite). In the main study, participants then will re-play these exact games to make sure to hit the idiosyncratic experience. Of course, these differences could also help better unpack differences in the genesis of nostalgic affect—in the above example when playing the same game, players would have both a common touchpoint (game content) and also variable experience (game controller and console).

Related to this issue of replaying the exact same game, the above-mentioned studies asked players of *Pokémon Go*, a game that builds upon the Pokémon franchise but is quite different from the original *Pokémon* editions, or asked participants to remember and report past gaming experiences. Indeed, nostalgic and positive memories might foster people's intention to buy or replay these games (Schindler & Holbrook, 2003; Sierra & McQuitty, 2007), but research has not yet investigated the actual re-playing experience. As recently shown, people might want to play on their classic console, especially classic Nintendo games which belong to the computationally hardest categories of games (Aloupis, Demaine, Guo, & Viglietta, 2015). Though these games may come with positive and supportive feelings of nostalgia, it is questionable to what extent people may become frustrated and disappointed when playing games that have been idealized in their nostalgic reverie (Kaplan, 1987). One can imagine that the feelings elicited by a game 20 years ago might not be the same feelings elicited today, for example given that action video games are known to boost cognitive abilities (Green & Bavelier, 2003) gamers with experience might not find older games as challenging as they did in their childhood. Thus, it is interesting to see how violations of anticipated playing experiences (positive or negative) shape the actual playing situation. Related to this issue, people tend to be wrong about estimating their future feelings:

Emotions can occur in complex blends...and people might fail to anticipate the precise nature of the mix they will experience...especially...events that produce a combination of positive and negative emotions. People often view the future in a simplistic manner, assuming that events will cause primarily good or bad feelings, rather than a rich mixture of both. (Wilson & Gilbert, 2003, p. 348)

It is reasonable that people, when deciding to re-play a video game associated with a meaningful past, miscalculate the fact that playing the game might also cause negative affect, such as nostalgic regret for the past or even frustration due to its (unexpected or forgotten) difficulty. Future research should control for, as well as specifically investigate, the discrepancy between expectations and actual re-playing experiences.

Finally, one issue that connects to a yet unanswered line of research is the limitation of cross-sectional data for video game nostalgia research. That means that studies have yet to evaluate how nostalgia relates to well-being and entertainment outcomes at one particular point of time but they cannot answer (a) how the integration of nostalgic games into people's life *changes* well-being in the long-run and (b) if entertainment gratifications may wear off after initially high enthusiasm—a sort-of novelty effect. For example, though games such as *Pokémon Go* had a steep rise attributed to nostalgia, most of the gamers have lowered their playing time or quit the game after a few months of enthusiastic play (cf. Kawa & Katz, 2016). For those reasons, research should keep in sight potential upcoming nostalgic video game releases and use longitudinal study designs to answer the question how long nostalgia's effects last.

4. Conclusion

This article has argued that nostalgia, as an experience evoked by replaying past video games, can significantly contribute to well-being and a sense of social identity. Hence, nostalgia is one—if not the—key factor for explaining the recent success of retro gaming. Although there are several preliminary studies that provide important insights, we see the opportunity and need for different types of additional research that is necessary to fully understand the phenomenon of retro gaming and its appeal to many people. We have tried to identify some yet unanswered research questions that we deem essential for this area of research as well as provide recommendations for methodological approaches that we would deem fruitful. Ultimately, we hope this contribution will encourage future work and debate about video game nostalgia and uncover how video games can serve not only as entertainment but also as time machines, bringing not only fun and joy but also well-being and meaning into the lives of players.

Conflict of Interests

The authors declare no conflict of interests.

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Article

Do We Need Permission to Play in Public? The Design of Participation for Social Play Video Games at Play Parties and ‘Alternative’ Games Festivals

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Abstract

Play is fundamental to being Human. It helps to make sense of the self, to learn, to be creative and to relax. The advent of video games challenged traditional notions of play, introducing a single player experience to what had primarily been a communal social activity. As technology has developed, communal play has found both online and real-world spaces within video games. Online streaming, multiplayer games and built-in spectator modes within games underpin online communal play experiences, whilst ‘alternative’ games festivals, play parties and electronic sports, provide real world spaces for people to meet, play and exchange knowledge relating to both playing and making video games. This article reports the study of social play events which bring people together in the same space to explore video games making and playing. Expert interviews with curators, and event facilitators provides qualitative data from which design processes are formalised into a ‘model of participation’ of social play. Four key areas of balance are proposed as core considerations in supporting participation in event design. The study of these events also suggests that their design and fostering of participation has the potential to evoke cultural change in game making and playing practices.

Keywords

cultural intermediaries; cultural transformation; games; independent video games; social play events

Issue

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1. Introduction

Attending a social play games event, such as an “alternative” games festival like A MAZE. / Berlin or Feral Vector or an evening “play party” such as Games are for Everyone or Wild Rumpus can provide new gaming experiences for the attendee. Such experiences may be in the form of engagement in socially mediated narratives co-constructed by spectators and past players which sit on-top of gameplay, (Isbister, 2016), exposure to new types of games and game making practices or finding a sense of togetherness amongst a group of strangers through playing socially (Goddard, Garner, & Jensen, 2016). Play parties and alternative games festivals seamlessly mix play with knowledge exchange, networking and socialising, providing attendees with a range of invitations to participate. Through participation in game making and playing, these events and their co-ordinators, as acknowl-

edged within an interview with Lorenzo Pilia of Talk & Play and A MAZE. / Berlin seek to engage not only with existing games communities but are also often interested in engaging with and promoting games making and playing practices to new communities. Thorsten S. Wiedemann of A MAZE. raises (within this research) that the programming of these events and the games they choose to showcase often differs in content, form or modes of interaction in comparison to events and games developed within commercial games making practices (Goddard & Muscat, 2016), being more expressive and often more aligned to art practice in their form.

This research seeks to study the design of events which promote video games playing and development in co-located contexts and to identify the ways in which the event facilitators design for participation. These events rely upon attendance and participation to exist (culturally and financially) and thus, participation is positioned

in this research as central to creating, maintaining and propagating social play events. Drawing from interviews with event facilitators and secondary research material publicly available about their work, these events will be studied in order to determine the needs of the communities who attend the events from the perspective of the event facilitator. The community needs will be used to inform the design and proposal of a model of participation in social play event design and to reflect upon the impact of these events on both the individual and on games making and playing culture.

The world of alternative games festivals and social play has had limited academic attention, despite the growing number of events which exist world-wide. The studies of play and games festivals which do exist aim to map the landscape of festivals in this field (Wood, 2016) and to study specific festival cases (Gavin, Kenobi, & Connor, 2014; Parker, Whitson, & Simon, 2017a). This study aims to contribute to this body of knowledge, focussing upon formalising design approaches, exposing practice and disseminating the knowledge drawn from a panel of experts whilst also considering the impact of these events upon society. The design of event and community participation has received significant academic attention within the fields of learning (Wenger, 1998; Wenger-Trayner, Fenton-O’Creevy, Hutchinson, Kubiak, & Wenger-Trayner, 2015), business (Wenger, McDermott, & Snyder, 2002), the arts (Simon, 2010; White & Parker, in press) and creative industries (Brandt, 2006; Parker & Galloway, 2017). Drawing from this landscape of theory around participation, the emerging model of practice identified within social play event design through this research can be evaluated, contextualised and better understood in terms of its impact upon individual and social participation.

This research focusses upon social play events which include alternative games festivals, play parties, and meet-ups. Electronic Sports, (eSports), events also make a significant contribution to social play design, however, these have been studied more extensively academically (see Hilvoorde & Pot, 2016; Seo & Jung, 2014) and sit beyond the scope of this research.

1.1. Social Game Playing Communities

The social play of video games exists in many forms, the most well-known of which targets the game making community, particularly established games companies, publishers and games related industries who share an interest in commercial games development. These large-scale events, (e.g. Game Developers Conference, or EGX), typically use traditional conference style approaches, mixing programmed talks, networking, and play sessions of video games in an exposition format. Commercial conferences tend to utilise a *one-size-fits-all* approach for the exposition of video games, providing a standard space for each exhibitor. In order to enhance their appeal to the commercial games making community, and as Holly

Gramazio, of Now Play This acknowledges within an interview, these conferences attempt to design spaces conducive to playing games and learning about games practices primarily for promotional purposes.

Independent games developers (indie developers), those who create games which typically sit outside of traditional commercial models in their content and production, are catered to by industrial conferences to some extent (Wood, 2016), however, in the last ten years, a range of alternative games festival have emerged, which focus upon diversity, creativity and experimental approaches to game development, promotion and publication. These festivals, like commercial conferences, make use of structured programming over a number of days, however, for Wiedemann, the spirit differs greatly, aiming to be more celebratory of game making and playing. The exhibition element tends to align more closely to artistic exhibition, fitting the presentation method to the work being shown. Alternative festivals also include practical workshops, inviting participation in the making of games in accessible sessions unlike those found at other games events.

There are also events which cater to more diverse audiences. Play Parties and meetup events invite participation from the general public, game developers (commercial and indie), games enthusiasts, academics and students. Alternative and commercial games festivals may cater to a range of these groups, however, often this is not to the same extent as found within meetup events. The play party or meetup tends to run for a few hours in one evening, happening multiple times in a year, focussing on community development or promotion of games as a form. The format varies from exhibiting games in a social setting to mixing exhibition with informal talks. The events also vary in presentation style from makeshift approaches which cobble together tables to facilitate games showcase through to polished curated exhibitions which use environmental design, reinterpretation of media and installation.

2. Analysing the Landscape: The Interviewees

To inform this research, six event facilitators were interviewed in semi-structured interviews lasting between one and two hours in length. The facilitators were selected for interview due to their experience of designing events which promote social play and game making practices. The events studied vary from well-established to those in their first year to provide insight into the range of challenges events can face at different stages in their development. Table 1 outlines each event studied within this research.

The interviews focussed upon four key themes: the event and practice of the event producer, exploration of the role of play within festival design, considerations of community in festival design and reflections upon the impact of festival practice upon the audience, culture and society. The data gathered from interviews and

Table 1. Overview of the events studied within this research including interviewee names, event descriptions, activity types, and attendee numbers.

Event and interviewee	Event Description	Event Classification and Activities
A MAZE. / Berlin 2008–present Thorsten S. Wiedemann and Lorenzo Pilia	Four day “International Games and Playful Media Festival” (A MAZE. GmbH, 2017) occurs annually.	Festival Curated and open exhibition, workshops (making & playing), curated talks, social spaces, parties, awards.
Arcadia 2017–present Malath Abbas	One day “celebration of independent games” (Arcadia, 2017) occurs annually.	Festival Curated exhibition, workshops (making & playing), curated talks, social spaces, parties.
Feral Vector 2012–present David Hayward	Three day “festival about making games and gamelike things”. (YMPT Ltd, 2017) occurs annually.	Festival Exhibition, workshops (making & playing), curated talks, social spaces.
Games are for Everyone (GAFE) 2015–present Andrew Dyce and Craig Fairweather	“A night of fantastic, raucous, beautiful games, mixed with drinks, music, and wonderful people” occurs 2–3 times per year (We Throw Switches, 2017)	Play Party Curated exhibition, social spaces, parties, commissioning new work.
Now Play This 2015–present Holly Gramazio	Three day “festival of experimental game design” (Now Play This, 2017) occurs annually.	Festival Curated Exhibition, workshops (making & playing), Curated talks, commissioning new work.
Talk & Play 2013–present Lorenzo Pilia	A bi-monthly event which “provides the opportunity to game enthusiasts, players and makers to meet and exchange knowledge in a friendly, relaxed and safe environment”. (BerlinGameScene.com, 2018)	Meet-up Open exhibition, curated talks, audience shout-outs, social spaces.

secondary sources underwent thematic analysis utilising the six-step process (Braun & Clarke, 2006). Thematic codes were drawn inductively from the interviewee responses in order to ensure that design concepts came from the data rather than being shaped by researcher perspectives (Saldaña, 2015). Data sets were compared per theme and were used to inform the design of the relationships presented within the model of participation which forms the core findings of this research (Braun & Clarke, 2006).

3. Needs of Games Communities

The interviews demonstrate that within their design process, facilitators consider the specific needs of the diverse communities who attend their event. Each specific attendee grouping presents issues, in relation to their own needs, and also in relation to their interactions with the needs of other communities at the event. Facilitators use design approaches to mitigate issues specific to and across each grouping. In order to better understand

the tensions within and across audience groupings, attendees can be broadly categorised as *games and professional* or *general* communities. These two groupings present competing interests which the facilitator must manage to support and promote participation in their event. Detailed overviews of the audience profiles for each event within the research is provided in Table 2.

Analysis of the interviews presented four key community needs that facilitators consider in facilitating participation: supporting attendee confidence, legitimising games as a social practice, providing spaces to support diverse interests, and managing competing interests. These key community needs were identified by facilitators across the data set and therefore are seen to be transferable considerations for participation design regardless of the specific event at hand. The considerations can be defined as follows:

- Catering to and supporting the confidence levels of attendees is a common consideration for facilitators, regardless of community. Confidence levels

Table 2. Overview of audiences for each event.

Event	Attendees (2017)	Games & Professional Communities	General Communities
A MAZE. / Berlin	5,500 visitors	Game developers* Publishers Practitioners from other fields	Students Games enthusiasts General public
Arcadia	200 people	Game developers*	Students* Games enthusiasts General public
Feral Vector	200 people	Game developers* Practitioners from other fields	Students Games enthusiasts
Games are for Everyone	500 people	Game developers* Practitioners from other fields*	Students* Games enthusiasts* General public*
Now Play This	2,100 people	Game developers	Students Games enthusiasts General public*
Talk and Play	150–200 people	Game developers* Practitioners from other fields	Students Games enthusiasts* General public

Notes: *indicates the groupings which are the majority at each event.

seem directly connected to the amount of knowledge or experience an individual has around an event and whether they are attending in a group or alone;

- Preconceptions and negative stigma around games is a significant issue for facilitators in relation to general community participation. Outside game making and playing circles, games are often still associated with negative connotations about their content, the people who play them and who make them. These connotations act as barriers to entry for expanding participation;
- Social play events present models of value in the work they select and promote to both professional and general games audiences. Such curation, however, can also be seen as gatekeeping, creating tensions within professional games communities in terms of their place within a curated 'image' of games development. The systems of value promoted by such events can enhance or limit participation by professional communities;
- Social play events tend to develop a 'core community' of regular attendees as they become more established. The core community differs across each event within this research, however, a distinct tension is apparent between the two different types of community identified: the professional and the general community. The needs and interests of these groups differ in complexity, accessibility, and participation levels. Accommodating such diverse needs to support participation presents significant programming challenges.

These four community needs provide valuable insight into the challenges faced by facilitators in event design. Further interrogation of interview data, using each of these community needs as analytical lenses provided a basis for the creation of a 'model of participation design' (Table 3). This model details the ways in which expert practitioners design their events in order to facilitate participation by their target audiences. The model of participation design proposes that social play event design for participation requires the balance of a series of competing interests of diverse communities.

Table 3. Model of participation design.

Comfort and Discomfort <i>(confidence to expand perspectives)</i>
Niche and Mainstream <i>(legitimacy to expand audiences)</i>
Curation and Gatekeeping <i>(diversity in space provision for participation)</i>
Insiders and Outsiders <i>(Scaffolding to support community expansion)</i>

Notes: The underpinning community needs are presented in italics.

The model is informed not only by the design techniques identified by the practitioners themselves during discussion, but also from consideration of specific examples of practice evident within the interview data set and within promotional material relating to each of the events within the study. Common themes in practice across the data set were identified and provided a basis

for the formation of the model. Further analysis was then undertaken to identify outliers and issues specific to individual events in order to recognise the diversity of audiences not only within each event but also across all of the events which make up the data set. The final model for participation design thus presents common practices amongst practitioners whilst also acknowledging innovative approaches specific to individual events. These outliers are presented as examples of best practice that are designed specifically for the community needs of a particular event. Inclusion of best practice examples in the design of the model of participation embeds, within the model, the promotion that a one-size-fits-all approach cannot be used to enhance participation and instead that facilitators must design for and innovate for the needs of their community, working with their community to enhance participation.

The first set of competing interests identified within the model are *comfort and discomfort* which relate to building a space and facilitating events which allows confidence to grow within a diverse community. Confidence and comfort are integral to laying a foundation from which the facilitator can support and disrupt conventional practices to achieve transformation through experimentation and playfulness in participation. Secondly, the *niche and mainstream* consideration acknowledges the difficult positioning of games and play more broadly in western culture and identifies approaches utilised by facilitators to promote legitimacy around video games in social contexts to enhance participation and diversify audiences.

Curation and gatekeeping, the third set of competing interests, recognises the event facilitator as a cultural intermediary, promoting value through their selection (and thus filtering) of media for their events. Interview discussions reveal that no one event can address tensions presented by the *exclusive* nature of promotion of value and thus, that social play events rely upon the proliferation of partner events with different aims, values and interests in order to support community expansion and develop participation in videogame playing and making practices. The fourth and final set of competing interests, *insiders and outsiders*, reflects the specialist nature of the communities which gather around videogames and explores the ways in which newcomers to the events can be supported by the facilitators or, by the community, through designed scaffolding in the event, to transition into full members of the community. The following section discusses each of the four competing interests proposed within the model in depth, providing insight into the approaches used by facilitators (with specific examples) to maintain (or otherwise) a balance to foster participation.

3.1. *Comfort and Discomfort*

Central to fostering participation in an event is the creation of a space where people feel comfortable. Interviewees

widely recognise that if people feel comfortable, they are more likely to participate. Pilia believes that considering the first impressions of an event, both in its promotional text and upon first entering the venue (including consideration of its atmosphere and facilities) are basic factors which can enhance attendee comfort levels inviting them to firstly attend and secondly to be open to the possibilities presented by the event. This view is also supported by Andrew Dyce and Craig Fairweather of Games are For Everyone and Gramazio. Play and playfulness are core design techniques used to build on first impressions and whether accessed by the attendee through active interaction with a game, talk or workshop or through being part of the audience, can help to unlock the potential of games as a form (Sharp, 2015). In attempting to make people comfortable at a social play event, it is integral that facilitators provide attendees with every opportunity to see potential in games and play *for themselves*. Facilitators, therefore, design different “ecologies of participation” (Fischer, 2011), a series of invitations which invite different levels of participation to suit the varying confidence levels of attendees. Gramazio, for example, provides print works for contemplation and creates spaces for spectatorship (Figure 1), whilst Wiedemann and Pilia aim to provide a programme with space for playful attendee improvisation and contribution. These are a few approaches which provide a *continuum of participation* within the programme of an event within which attendees can be active agents in selecting activities to suit their needs, comfort and confidence levels enhancing their potential for participation.

Comfort and confidence fosters attendee participation at a level which suits their needs, whereas discomfort can act as a barrier to participation. In seeking to promote games as a cultural form, many of these events aim to redefine attendee preconceptions around games; such challenges to individual value systems can cause discomfort. Play, however, inherently contains transformative potential (Bogost, 2008) which can be fostered by event facilitators to aid shifts of perspective whilst disarming discomfort. Transformative play can have many effects for the player including shifting their thinking, behaviour, and social relationships with others (both players and non-players) (Salen & Zimmerman, 2004). Play or playfulness in event design, such as providing ecologies of participation and supporting attendee agency, affords the potential to transform attendee perspectives around game playing and making practice.

David Hayward acknowledges this potential for transformation suggesting that discomfort can achieve similar effects. He believes physically relocating to attend an event in another place (potential for discomfort) can free individuals from the social limitations faced everyday providing them with a space to experiment with aspects of personal identity, behaviour or ways of thinking. Such experimentation through participation can transform their thinking both within and beyond the event. Shusterman (2012, p. 29) promotes the social element



Figure 1. Many events design spaces which allow play and spectatorship to co-exist, supporting ecologies of participation. These include A MAZE. / Berlin, left showcasing SIHEYU4N (We Are Muesli & Koning, 2015). Image copyright by Jens Keiner (2017, reprinted with permission). Right showcasing Now Play This. Image copyright by Ben Peter Catchpole (2017, reprinted with permission). Games Are for Everyone and A MAZE. / Johannesburg.

of experimentation believing that “the aesthetic experience of collaborative creation, and even the cognitive gains from exploring new practices that provoke new sensations, spur new energies and attitudes, and thus probe one’s current limits and perhaps transcend them to transform the self”. The potential for individual transformation, therefore, can be driven not only by programming a continuum of participation but also by the approaches of the individual motivated by event affordances.

Games and play have inherent links to culture (Caillois, 1958/1961; Huizinga, 1944/1949), often providing either a reflection of culture or the potential for transformation of culture (Salen & Zimmerman, 2004). The framing of games, play and playfulness more broadly, in an event context is key to unlocking its transformative potential (Salen & Zimmerman, 2004). Events which seek to influence the culture of games playing and making practice, therefore, must consider programming to explore cultural concerns whilst also fostering participation through a balance of comfort and discomfort to create conditions to unlock the transformative potential embedded in play.

3.2. Niche and Mainstream

Social play events which promote games playing and making practices are niche in nature and tend to appeal to specific audiences. Videogames as a form, have a broadly negative reputation in *mainstream* culture, often attracting demonizing headlines in the media (i.e. Manager, 2015; The Telegraph, 2012). News outlets are a form of cultural intermediary, organisations which mediate between producers and consumers (Hesmondhalgh, 2006) providing frameworks for understanding cultural meaning (Venkatesh & Meamber, 2006) and legitimacy (Smith Maguire & Matthews, 2012). Negative notions of video games in mainstream media lead to a misunderstanding of video games as a form, promoting their negative qualities and negating their potential cultural and

societal value. The stigma surrounding video games in mainstream media and their lack of recognised value in Western culture (Bogost, 2008) presents issues to the expansion of participation in social play events.

To disarm the stigma around video games, their creators and their players, event facilitators including Dyce and Fairweather use *accepted* social settings (such as a bar or club) to try to “normalise” video games for mainstream audiences. Social spaces are embraced by society for other forms of media (i.e. cinemas, libraries, theatres) therefore, templates exist for legitimate video games social space design. Using the legitimising qualities of such spaces, however, requires reconsideration of models of presentation of games in a social context. Arcades provide a historical model for the presentation of games in a social context, a model adopted by the commercial games conferences *one-size-fits-all* approach to exposition. This model limits social potential, minimising space for spectatorship and providing difficulties in participating due to high attendee numbers. Games are naturally a form of social technology which provide a system to foster interactions through play (Flanagan, 2009) however, as seen with conferences, arcades, galleries and museums (White & Parker, in press) their social potential can be expanded or limited by event design.

Facilitators design to enhance social potential of games through careful curation of games with affordances to suit social settings (i.e. multiplayer or physical games) (Goddard & Muscat, 2016). Dyce and Fairweather, through simplification of control schemes and designed presentation of games aim to remove boundaries and enhance participative draw (Figure 2). Such re-interpretation of games can enhance their social potential and embed them legitimately within their social context. Wiedemann believes video games will always remain a niche interest, however, the promotion of their value, beyond that seen within mainstream media may enhance of participation and aid the redefinition of games culture.



Figure 2. Games are for Everyone uses arcade cabinets as artworks in their own right which also house experimental games, providing participative draw and supporting ecologies of participation for players, spectators and those who wish to ‘view’ the cabinets. Image copyright by We Throw Switches (2017, reprinted with permission).

3.3. Curation and Gatekeeping

Events which showcase games culture typically involve a selection process to determine work which is deemed *suitable* for the event. An open call for submissions to the programme (i.e. A MAZE. GmbH, 2017; Now Play This, 2017) or invitation to individuals to contribute to the event based upon the facilitator’s knowledge of their work (as acknowledged by Pilia in organisation of games showcases at Talk & Play and Wiedemann in programming the A MAZE. / Berlin exhibition space) typically provides a wealth of material, from which the facilitator (or an expert panel) can make selections to create the event programme.

Selection positions the facilitator as curator, associating value and legitimacy to the work they choose over that they reject (Balzer, 2014). The facilitator-curator is again a form of cultural intermediary, applying their expertise within their field to frame material as having value (Smith Maguire & Matthews, 2012). Parker et al. (2017a) position Indie Megabooth, a curated independent games showcase, as a cultural intermediary, recognising its role in promoting a cultural image of indie games propagating the “popular discourse around ‘indieness’ in the game industry and gaming culture”. They propose that Indie Megabooth along with other key cultural intermediaries act as “curator-gatekeeper” in the selection and promotion of indie games.

In designing for participation, whether for game makers or players, facilitators must consider the balance be-

tween curation and gatekeeping. These two very similar concepts of value promotion can be differentiated by considering the facilitator’s motivation. Gramazio believes curation opens the opportunity for the event to build a narrative around a series of selected media and speakers (Dernie, 2006) whilst Dyce and Fairweather feel they can communicate messages which perhaps compete with those promoted in mainstream media. Gatekeeping on the other hand, particularly when it relates to the promotion of a particular image of a community (Parker et al., 2017a), can be seen as defining the general audiences’ “social reality” (Shoemaker & Vos, 2009, p. 3) of that community. In turn, this can exclude and alienate portions of the game making community who are not deemed to *fit* the image or values being promoted, leading to divisions and friction (Parker et al., 2017a).

The balance of curation and gatekeeping lies perhaps in transparency and diversity. With gatekeeping, “issues and events that are not covered are absent from the world view of most audience members. People cannot know about what the media fail to tell them” (Shoemaker & Vos, 2009, p. 4). Cultural intermediaries shape audiences’ experiences of game making and playing culture through their selection of material and narrative creation. The motivations for facilitating an event and a facilitator’s own sense of cultural value can shape their curatorial approaches (Balzer, 2014). The interviews revealed several motivations for event facilitation including developing games culture, building communities, redefining social play conventions, and inspiring talent. Trans-

parency around the motivation of an event throughout its promotional material and its operation provides attendees with clarity helping to manage their expectations, potentially limiting friction. Additionally, the diverse motivations for event facilitation creates a landscape of unique events, each with a particular focus and approach to potentially suit different group interests (Figure 3). Taste is a socially formed concept which has an organising feature often grouping people together with shared interests (Smith Maguire, 2015) thus the greater the diversity of social play events that exist within the landscape, the more likely that the shared tastes of diverse communities will be catered to by at least one event, potentially avoiding alienation. Each social play event can be seen to co-exist in an ecosystem, supporting the participation and development of its own communities, whilst also expanding the ecology of participation across all social play events by providing unique opportunities which cater to diverse audiences.

3.4. *Insiders and Outsiders*

Dyce and Fairweather, Pilia, and Wiedemann, acknowledge that social play events are interested in diversifying audiences to address issues of the niche and mainstream and to refresh the practice of the games making community through inviting, inspiring and developing new perspectives, talent and voices. The ‘core community’ of an event can be positioned as ‘insiders’ who have expertise, social bonds and previous knowledge of the event, forming a community of practice (a group of individuals who form shared values, beliefs and practices through shared interest of a subject; Wenger, 1998). This core community may seem closed to ‘outsiders’, newcomers to the event, perhaps through appearing as Hayward acknowledges in relation to his experience, an intimidating ‘clique’ (Wenger et al., 2002) or as identified by Pilia, through boundaries presented by specialist knowledge and expertise (Wenger-Trayner et al., 2015).

Balancing the needs and interests of professional and general communities in programme design can be difficult. Professional communities tend to be interested

in opportunities to enhance their specialist skills, connect with peers, potential collaborators and publishers whereas general communities tend to be interested in finding access points into game making and playing practices. Pilia believes that it is not possible to suit the interests of everyone, and specialist communities may feel alienated or disenfranchised by general programming for a broader audience.

The social play event, in expanding participation, can be understood as bringing together several communities of practice (each with competing sets of shared experiences, interests and values), which sit across the interdisciplinary landscape of practice (Wenger, 1998). ‘Competence’ is a socially held quality, which helps individuals to operate within and across communities of practice (Wenger-Trayner & Wenger-Trayner, 2015, p. 13). Within the game making community, competence may be seen as, for example, familiarity with game engines, artistic techniques or design approaches. Should an individual seek to enter a new community of practice, their competences will either shift to “reflect the competence of the community” or will challenge and potentially transform the “regime of competence” of the community (Wenger-Trayner & Wenger-Trayner, 2015, p. 14). It is difficult for a general community member to develop specialist expertise upon their first interaction with the professional games community, however brief, initial interaction will allow familiarity to develop and may encourage individuals to continue their learning beyond the event, eventually developing competencies that allow them to become games practitioners. The professional community can benefit from the expertise of general community members as they can draw from their knowledge and experience of participation in other specialist communities of practice, which may indeed challenge and perhaps enhance the practice of the game making community (Wenger-Trayner & Wenger-Trayner, 2015).

It is not possible to design a community of practice (Wenger, 1998), therefore, the facilitator, whether starting a new event or building from an established community, can only design conditions within which a community may drive its own development (Parker & Gal-



Figure 3. Social play events create unique experiences around playing and making practices as evident with through: (a) the physical play of Carpe Diem (Lun, 2017) at Now Play This—Copyright by Ben Peter Catchpole (2017, reprinted with permission); (b) the consideration of speaker and topic diversity at Talk & Play—Copyright by Julian Dasgupta (2017, reprinted with permission); (c) and the informal social spaces provided by A MAZE. / Berlin—Copyright by Jens Keiner (2017, reprinted with permission).

loway, 2017). Designing for participation is proposed as scaffolding that facilitators can provide to support transformational shifts and expansion of communities. Dyce and Fairweather, Hayward and Pilia all recognise that the exchange of knowledge, experiences and competencies can naturally emerge from the communities themselves given the creation of comfort, careful management of the niche and appropriate curation of an event.

The scaffolding provided to support transition from ‘outsiders’ to ‘insiders’ in a community by facilitators includes, for Pilia, programming accessible content, supporting knowledge exchange and for Malath Abbas, Pilia, and Wiedemann providing attendees with opportunities to present, participate and actively create the event themselves. Pilia also believes that the provision of on-line spaces for the community to continue engaging beyond each event is integral to participation and on-going involvement. Dyce and Fairweather believe that it is not possible to fully integrate into a community by attending an event only once; repeated attendance is needed to allow an individual to develop competencies to transition from “outsider” to “insider”. This idea is also echoed by Pilia.

4. Analysing the Model: Facilitation Impact and Challenges

The model of participation provides an overview of community driven concerns for event facilitation. The model can be used by facilitators to evaluate their design approaches prior to or in the development of event facilitation. Each event, however, must balance the different factors in the model in an appropriate way for their specific community and event motivation as can be seen by the diverse approaches used by facilitators in this research.

The model and methods of design used by facilitators also provides insight into the impact and value of these events which cannot be measured in monetary terms but rather is recognised in the impact upon individual (local community) and also society (see Table 4).

Facilitators face significant issues other than those presented within the model. Each event within this research relies upon an individual to occur which, for some,

causes significant personal cost on stress levels, morale and financial sustainability. Similar connections between an event and an individual have been recognised in other studies of social play events (see Parker et al., 2017a). It seems that the individual, their reputation and networks are core to creating appeal, programme diversity, and motivating the recurrence of events. In turn, the individual is able to shape the event programme through their own curatorial voice contributing to event diversification (niche and mainstream issues) whilst potentially aggravating issues around curation and gatekeeping (however, Wiedemann acknowledges the importance of working with a team to avoid unconscious bias or for Hayward, what could be seen as a ‘personality cult’).

The publisher and commercial games community are under-represented within this research, with few interviewees providing insight into the design for involvement of these audiences. The experimental games and practices showcased at these events exist out with *accepted* commercial frameworks making it difficult to explain their value to commercially focused entities. Throughout the interviews, explaining the positioning of games as valuable cultural artefacts was a constant issue. Half of interviewees have previously secured some public and/or commercial funding to support their events, however, overall, they rely upon in-kind support, volunteers, and ticket sale income. Social play events exist in flux from year to year, struggling for sustainability due to such issues with funding and promotion of value to potential stakeholders.

Social play events have the potential to lead cultural and social transformation around video game making and playing practice as demonstrated by the model of participation, however, many facilitators recognise that these new forms of cultural intermediation are lacking in models of practice which can aid the creation of sustainable models independent of the individual. Wiedemann suggests that institutionalisation of events into independent organisations run by a team or by a series of lead facilitators, each for a fixed term, is a possible solution to personal attachment, stress and cost of event facilitation. It may be, however, that as Smith, Maguire and Matthews (2012, p. 5) suggest, “the personal is necessarily professional” in cultural intermediation and that

Table 4. An overview of the impact of social play events locally and more widely as described by the model of participation.

Impact of social play events on individual and local community

- Building of confidence and new relationships with game playing and making practices through agency in participative levels
 - Inspiring, expanding and motivating communities through programming, agency and enhancing social potential
 - Providing spaces for experimentation, playfulness and potentially individual transformation
-

Impact of social play events on industry and society

- Designing spaces which enhance the potential for cultural transformation of game making and playing practice
 - Redefining the image of games socially and culturally to general and professional audiences
 - Defining ways of positioning games authentically in social contexts to enhance their legitimacy
 - Collaborative formation of culture through support, diversification and propagation of communities of practice
-

successful event delivery relies wholly upon the personal effort and motivation of these individuals, their reputation and networks. Creating supporting infrastructure and models for institutionalising these events may propagate their growth but may also negatively impact their legitimacy, appeal and programming.

5. Conclusion and Future Work

The facilitation of participation in social play events can be seen to rely upon the balance of four key factors: Comfort and discomfort; niche and mainstream; curation and gatekeeping; and insiders and outsiders. The model presented within this article seeks to formalise the design considerations for social play participative event facilitation, as informed by analysis of expert facilitators understanding of the needs of their communities. This model is theoretical, formed through discussion with expert practitioners and secondary source analysis. It aims to combine common sense considerations with design practices in order to facilitate participation, foster agency and potentially lead to transformation for attendees, and for game making and playing culture as whole. The model aims to summarise complex considerations of events which cater to a range of audiences across diverse environmental contexts. It does not provide a one-size-fits-all model for the design of participation and if applied, needs to be tailored to each new event. It is also important to acknowledge that the model is not exhaustive and could benefit from expansion of the data to consider the design processes of further social play events and practical application as a design approach in order to fully test its robustness.

Social play events are emerging forms of cultural and social practice which exist within an ecosystem and their facilitators could benefit from opportunities to share their experiences and insights with one another more formally than at present, in order to help explore sustainability and the development of potential models of infrastructure to support event delivery. Academia could play a significant role in facilitating, formalising and revealing these practices, and indeed, Concordia University has taken the lead in such knowledge sharing, hosting an “Indie Interfaces Symposium” in 2017 (Parker et al., 2017b).

The facilitation of co-located social play can clearly make significant contributions to individual attendees, games communities and to society beyond games playing and making cultures. These cultural intermediaries are at the forefront of a new movement in social-technological-artistic practice and, driven by their interests in invoking transformation and promoting the form, are leading the way to new ways of making, playing and living with video games.

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Conflict of Interests

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Article

Games without Frontiers: A Framework for Analyzing Digital Game Cultures Comparatively

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Abstract

Currently in game studies there is a gap in frameworks for comparatively researching game cultures. This is a serious shortcoming as it ignores the transcultural and transnational aspects of games, play and their cultures. Based on Hepp's (2009) transcultural framework, and Du Gay, Hall, Janes, Mackay and Negus's (1997) circuit of culture, this article proposes a structure to comparatively analyze game cultures. This procedural method comprises several steps determining specific contexts of game culture and their categories for comparison. Each step is illustrated with a case example. Finally, we recommend placing game cultures on a transnational spectrum, which helps in suggesting that many digital games express both local and international characteristics.

Keywords

comparative analysis; game culture; game studies; mediatization; transculturality; transnationality

Issue

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1. Introduction

The area of games studies is robust after extensive research has been conducted in the past couple of years. Game cultures are usually studied and documented independently, whether in an explorative approach like Taylor's ethnography of EverQuest (2006), or in observing specific social arrangements like Jakobsson's study of Smash Bros. console clubs (2007). When analyzing digital games and their cultures, it is important to consider their transnational aspects, due to growing rates of online play where national boundaries are becoming less relevant. This growing international importance of games is mainly attributed to the processes of globalization and digitalization, since individuals are no longer limited to playing with their immediate social circles, but instead are constantly communicating and playing with others around the globe.

Game cultures are neither totally national nor global, retaining some qualities from both classifications. This can be observed in nationally appropriated game cultures of a certain game. For instance, members of the FIFA game culture in Germany share certain characteristics with FIFA gamers in the UK. This assumes that FIFA game culture is not really a global culture manifesting the same way everywhere in the world and neither is it completely localized. The overall FIFA game culture has certain qualities shared by several localized game cultures worldwide, while still having specific characteristics that only manifest locally. This assumption applies to a multitude of other game cultures, whether single or multi-player, offline or online. With lightning-fast Internet mediated communication, game cultures today are experienced globally, but the interesting question is: how far they are truly "global" or appropriated by national sub-cultures. We are quick to assume that if games are experi-

enced by multiple game communities in different nations then they are international or vice-versa. Hence, it is important to examine how global or local these cultures are, and what drives these characteristics.

Currently there is a research gap in comparative game studies. This is a serious shortcoming as it ignores the transnational aspects of games, play, and their specific cultures. The experience of individual gaming in local, everyday contexts is structurally connected to a transnational and highly commodified game system (Šisler, Švelch, & Šlerka, 2017). Games (unlike other types of media) are a hybrid of communication and entertainment, with unique societal influences and a significant impact on the formation of individual identities (Hand & Moore, 2006). Digital games are entertainment applications of digital media that comprise specific qualities, especially characteristics of interactivity and simulation. Gaming encompasses an object (medium), as well as multiple forms of computer-mediated and face-to-face communication (ranging from interpersonal to “let’s plays” and mass media communication). Researchers looking at game cultures not only have to pay attention to game related dimensions, but also increasingly to real-world contexts, due to the advanced possibilities of online gaming. Van Looy (2010) hints at the importance of other contexts when questioning if there is more than just forms of play connecting games and society.

While Hepp (2009) developed a framework for the comparative study of media cultures, the simple application of this framework to game cultures is not sufficient. Game cultures require certain additional aspects to be addressed, which are unique to this medium and do not apply to other media cultures; like defining game culture on a micro, meso or macro level. We propose a procedural method for the comparative study of game cultures to address these gaps. Our suggested analytical framework gives researchers a protocol to follow in order to provide both a holistic and detailed study.

Still, why study games and their cultures comparatively? Finding commonalities and differences within game cultures from different countries (or even games) helps explore the idea that game cultures are not bound by national (or non-territorial) borders but instead exist as a global, united subculture. Certain game cultures can even be described as a cultural cross section, similar to folk, high and urban cultures. However, more than just assessing the global or local aspects of game cultures, studying them allows us to look at specific characteristics that relate to superordinate processes such as individualization, globalization, commercialization and mediatisation (Hutchins, 2008; Simon, 2006). This article will first highlight and define the basic elements of the framework: defining what game cultures are, their contexts, and transculturality as a perspective. Then, we will outline the basic steps in our process, giving examples when possible. Finally, we discuss the framework, its application and its limitations.

2. Digital Game Cultures from a Theoretical Perspective

Shaw (2010) published an article investigating the definition of game culture. She surveyed academic literature and mainstream press to provide a concrete definition but instead provides several based on: who plays, what they play, or how they play. Today, the situation is not much different. Academics utilize various definitions based on the specific context of their research. Heuristically, there are different levels of complexity concerning digital gaming. These could be arranged on a continuum between game and society, from the micro to the macro level, without implying a certain hierarchy or specific determinism. For our framework, we provide a system for defining game cultures based on the reassessment of other game cultures and broader media cultures. This falls in line with Mäyrä’s suggested explanation of game culture: “rather than a single ‘game culture,’ there are several of them, as visible and invisible sense-making structures that surface not only in games themselves, but in the language, practices and sensibilities adopted and developed by groups and individuals” (2006, p. 103). Of course, the boundaries between different game cultures are not fixed (as each form of media culture does not have fixed borders). Thus, determining how far digital games are integrated in everyday life of gamers, and what social network structures or participative actions they create, is crucial. These issues are gaining rapidly in importance because of the increasing potential of digital games for connectivity, interactivity and collaboration on a global scale.

While both academics and mainstream discourse define game culture heterogeneously (Shaw, 2010), we suggest that game culture can be differentiated based on macro, meso or micro characteristics (see Table 1). When defining game cultures on the micro level, the approach acknowledges the culture of one specific game or community. For example, a study can focus on a specific game, such as the game culture(s) of World of Warcraft or Super Smash Brothers. Or by locality, such as the game culture of a specific community in a town or city. Or even as a combination of both these aspects, such as the World of Warcraft game culture in Germany. Examples of studies defining game culture on the micro level, and accordingly investigating them as such, are abundant. Research looking at specific phenomena in World of Warcraft is plentiful, like Prax (2010) who looks at leadership styles in guild raids, Brown (2011) who observes cheating and erotic role-players, or Sheng-Yi, Yu-Han and Chuen-Tsai (2012) who study multiple character management of World of Warcraft gamers.

Characterizing game cultures on the meso level entails finding common aspects or features that span different games and communities. After the groundbreaking study by Taylor (2006) where she applies a meso level definition of game culture (multiplayer game culture), several other studies follow suit, utilizing a definition that includes several games and communities. Lin and Sun

Table 1. Various levels of defining game cultures.

Level of game culture definition	Description	Example cultures
Micro	Cultures of a specific game or community	World of Warcraft culture, EVE online culture. Or game cultures of a specific locale, e.g. California Smash Brothers culture, German FIFA culture.
Meso	Cultures of multiple games or communities with a common, unifying characteristic	PS4 gamers, Nintendo gamers, Retro gamers, Modders, Hackers, Speed Runners
Macro	The overall culture of games, gamers and gameplay	Game culture worldwide, or whole game culture of specific countries, e.g. South Korean, American or European Game Culture.

(2007) analyze player discourse surrounding the “magic circle” in free-to-play games. Silva (2012) also does the same when studying ludic shopping, through applying a concept of game culture that includes several social network games. Moreover, looking at eSports and related phenomena, Simon (2013) refers to fight gamers, or those who play fighting games, as a distinct culture and community separate from eSports. Finally, Quandt, Grueninger and Wimmer (2008) observe adult players of several games, who belong to various game communities and cultures. Hence, as seen from the work of several academics, a meso level approach to game culture is possible when there is a unifying factor present, whether it is between the participants (age or gender), the genre of game, or method of play (console or PC, modding or speed running). The unifying factor doesn’t necessarily have to relate to the game itself (Lin & Sun, 2007; Taylor, 2006) but it can also be a factor associated with gamers (Quandt et al., 2008), or the community (Simon, 2013).

Utilizing a definition of game culture on a macro level attempts to characterize the entirety of gamers (and certain aspects of their culture) as a whole. This is applicable when we attempt to study or observe game culture with questions like “what does it mean to be a gamer?” or “how do gamers communicate?” With questions like these, the applied definition of game culture is a macro one, assuming that all players of all games (even casual ones) share similar characteristics and behaviors that justify their characterization as a culture. Academics utilizing this definition in their work are also quite common. Juul (2010), for example, utilizes this definition of game culture when talking about the casualization of games and their players. In his study of the World Cyber Games, Wimmer also provides a macro definition by characterizing game culture as a whole: “We can define digital game cultures as an aspect of the current media culture with increasing significance, whose primary resources of meaning are manifested in digital games that are mostly mediated or provided through technical communication media such as handhelds or consoles” (2012, p. 527).

2.1. Contexts of Digital Game Cultures

It is important to note that games and their cultures do not exist separately and should, ideally, be studied within certain contexts to understand them better. King and Krzywinska (2006) state: “Gameplay does not exist in a vacuum, any more than games do as a whole. It is situated instead, within a matrix of potential meaning-creating frameworks. These can operate both at a local level, in the specific associations generated by a particular episode of gameplay and in the context of broader social, cultural and ideological resonances” (p. 38). The importance of context is considered by several game studies academics, such as Juul (2005) and Taylor (2006), or Mäyrä (2008) who expresses that the study of games should focus on the interactions between the game and gamer, as well as the occurring contexts from this interaction. Contexts should be especially acknowledged in order to understand game culture holistically.

Building on Du Gay, Hall, Janes, Mackay and Negus (1997), and Hepp’s (2011) general work on media cultures, Mitgutsch, Huber, Wimmer, Wagner and Rosentingl (2013) suggest five domains to be utilized in the study of digital games and their cultures. The contexts of production, representation, appropriation, identification and regulation are a complex circuit that are interweaved and continuously affect each other. These contexts can be seen as articulations of specific game cultures, which are always “historically, temporally and spatially rooted and contextualized” (p. 10):

- The context of (re)production (of and within digital games) deals with the structures and methods of creating games and play. This context is not limited to the gaming industry and the field of game development alone but also deals with user generated game content. Examples of studies dealing with this context include; Simons and Newman (2003) who look at video game cultural and textual production online, or Lehdonvirta (2009) who notes

attributes that drive purchase decisions in games with micro-transactions;

- The context of representation deals not only with the depiction of digital games in public discourse and mass media, but also with the illustration of different topics in media products, such as: violence, family values or gender roles in digital games. Studies dealing with this context include McKernan (2013) who looks at the coverage of videogames in the New York Times from 1980 onwards;
- Regulation, as a context, involves the actions of non-producing institutions, like political or governmental institutions, and their effect on game culture. This context usually deals with issues such as age restrictions for games or the Entertainment Software Rating Board's (ESRB) ratings. Studies dealing with the regulation context include Jordan, Buente, Silva, and Rosenbaum's (2016) ethnography, which considers various types of regulation regarding in-game transactions;
- The context of appropriation highlights the process of how games are embedded into daily life. This includes occurrences such as game-specific rules and rituals. Example studies dealing with appropriation include Wimmer and Nickol's (2013) study on the sports management game Hatrick, and Lin, Sun and Tinn (2003) who look at gaming clan behavior;
- Finally, the identification context denotes the ongoing process of building identity based on the dialogue or patterns communicated in games. The process is best observed when individuals don special clothes, or use specific jargon to display their membership of a community, or to differentiate themselves from non-gamers. Here example studies include Shaw's (2013) case study on the videogame play of women who do not identify as gamers, and Wimmer and Sitnikova's (2012) research on the identity of game industry professionals.

In addition to offering a more holistic image of digital game cultures, the analytical consideration of these contexts also provides a systemization of certain phenomena that can be studied over a number of game cultures. An examination of the production contexts reveals external conditions, social practices and ideologies that influence the development of a game. The analysis of game texts, representation and rule structure, sheds light on how game models propagate social models, preferred lifestyles and implicit values or norms. The context-sensitive study of the appropriation of digital games can illustrate the variability of readings, the variety of creative and productive practices, and different forms of creating meaning and pleasure. It is important to state that these contexts do not exist in a linear process, they are continuously ongoing and influencing each other. One

prototypical example of how these contexts overlap is fan production (Jenkins, 2006). Fans are well known for producing immaculate works of art or fiction in tribute of their favorite games and media products. In the realm of games, fans even modify their favorite games, write detailed guides or manage dedicated wikis; otherwise known as fan scholarship (Thomas, Zagal, Robertson, Bogost, & Huber, 2009). These activities fall within two cultural contexts: (re)production, since this context considers the production of user generated content, and appropriation; because it deals with how games are utilized in ways other than play, or how they are rooted in the lives of their players. This circuit, with its entwined contexts, describes not only the genesis of game cultures, but also the day-to-day processes of their members.

Game cultures and their contexts can be examined individually but can only be understood in their full complexity if they are observed as a comprehensive process of changes, expressing itself in the ever-evolving forms of media and communication. Therefore, digital games fit well into the context of the processes of mediatization, individualization, globalization, and commercialization (for this basic argument, see Simon, 2006), which are currently reshaping society and our everyday life (for an overview, see Krotz, 2017). Digital games are arguably one type of medium which bolsters social change, especially as they become more intertwined in the lives of individuals; utilized in a variety of ways, and continually discussed and re-appropriated. Gamers spend countless hours communicating with both other players and non-player characters in games, with communities focused solely on the discussion of games and their content. Hence, the cultures of games provide opportunities to understand the influence this interactive medium has on identity construction, social relations, political processes and even society as a whole. Supporting this insight of the complex connection between game reality and societal reality, Hand and Moore (2006) point out the duality (Anthony Giddens) of game experience and game contexts in connection with game culture: "Digital gaming may be seen as both embedded within existing sociocultural frameworks (as 'cultural artifacts'), and as enabling novel articulations of community and identity to emerge (as forms of 'culture'). Digital gaming represents a distinct cultural form which at once problematizes current understandings of community and identity, and allows us to explore emerging patterns of community and identity formation" (p. 180).

2.2. Transnationality and Culturality of Games as a Research Perspective

As mentioned earlier, game studies usually focus on one game culture at a time and comparing cultures is not a common process. Of course, game cultures are well described concerning individual dimensions in specific settings, such as the fields of juvenile gamers, girl gamers (Shaw, 2013), massive multiplayer online games (Brown,

2011), and participatory game cultures like the modding scene (Poor, 2013). Still, few research has attempted to compare video game practices in different cultures, such as Taylor's (2011) look at Halo 3 game cultures around the world or Šisler et al.'s (2017) study on gaming in Czech Republic and Iran. Šisler et al.'s comparison is innovative, but while they provide a new quantitative method for comparison (normalized social distance on social network sites) and pinpoint aspects to compare (video game production and consumption), their framework focuses on the cultural industry and materiality (hardware, software, game development etc.), lacking the holistic contextual approach we suggest (for other case examples, see Jin, 2010; Kerr, 2017). Wolf (2015) provides snapshots into the gaming environments and cultures of different countries worldwide. However, the account of each country focuses on divergent aspects and the overall comparison is not uniform. Quandt, Chen, Mäyrä and Van Looy (2014) provide a comparison of gamers from four different countries (Germany, Flanders, Singapore and Finland) and while they use standardized testing to note similarities and differences between these gamers, they do not address other contexts of game culture, such as user-generated content, or representation of games in public discourse. Though this is not necessarily negative, it limits the comparison to only players and their preferences, meaning that it is not—in a sense—a game culture comparison. Our framework hopes to address gaps in previous comparative games research by providing a holistic and systemized way of comparing game cultures, which considers all of their necessary contexts, allowing researchers to select appropriate ones based on their research interests.

Not all games and their cultures are created equal. Certain social rituals, rules and languages do not necessarily span across multiple cultures. Therefore, the influence certain cultures have on issues, such as identity construction or social relations, are not constant. A game could be heavily dependent on cooperative play, making it an ideal community and culture for social interaction, while the same game played elsewhere might foster competitiveness and rivalry instead. Each resulting game culture can, in theory, promote completely different rituals, rules and languages. These differences between game cultures, whether based on locale or the game itself, are where a need for our comparative framework arises.

3. Digital Game Cultures from an Empirical Perspective

Dealing with media cultures in general, Hepp (2009) provides a framework where it becomes “possible to conduct comparative research on (territorial) national media cultures as well as on other (deterritorial) forms of present media cultures” (p. 1). He notes that this sort of comparison is extremely beneficial in realizing cultural articulation and power relations (Hepp, 2009). The first step in Hepp's framework is to analyze cultural patterns (p. 9). Comparing manifold is the next step, and during

this stage it is important to expand the comparison to more than just “binary semantics of national comparison” (p. 10). The third and final step involves criticizing the data in a multi-perspective manner (p. 11). We add to Hepp's three-step processes in an attempt to tailor the approach for game cultures. We suggest a procedure of defining game culture, limiting the scope of analysis to certain contexts, pinpointing which phenomena to look at, and placing the game cultures on a transnational spectrum. This is done in hopes of clarifying the comparative process, restricting it to specific phenomena, and finally, indicating the degree of transnational or local nature of the analyzed culture.

3.1. Defining Game Culture

As mentioned before, defining game cultures is a heterogeneous process heavily based on the interests of the researcher. The comparative analysis can only begin when the researcher completes defining his game cultures. In the case of a macro definition of game culture, we can still conduct a comparative analysis with macro cultures from different nations, defining it as the overall game culture of all games and comparing existing ones in Germany to other nations, for example. However, comparisons are not only possible within physically distinct locations, but also digitally distinct ones. This means that the comparative framework is suitable in comparing cultures of different games and communities simply by defining game culture on a micro or meso level. Even when both games have a player base in the same country, they can still be compared, because they are ultimately different game cultures. For example, using this framework, one can compare the World of Warcraft culture in Germany to EverQuest or any other game played in the country. Therefore, the first step in our framework is to define two (or more) game cultures for comparison. This can be done on the micro, meso or macro level; with game cultures being characterized on national boundaries, games played, method of play or even the players themselves.

Nevertheless, the cultures defined for comparison do not always have to be characterized on the same level, which means that macro-defined cultures can be compared to micro ones. This is an extremely beneficial consideration, so that cultures can be compared and investigated within different research contexts. For example, one can compare the representation of certain topics in two micro cultures from different Massive Multiplayer Online Role-Playing Games (MMORPG), like World of Warcraft and The Elder scrolls online. Or alternatively, one can also observe the dimension of representation in one MMORPG compared to the meso culture of the genre as a whole. Either way, once the cultures for comparison have been defined, the researcher should then pinpoint a context for investigation applicable to both cultures.

One thing to note is that defined cultures can also overlap. In a previous study conducted comparing

‘trolling’ in two nationally distinct online gaming communities, we defined game cultures on the macro level; as the overall game culture of Russia or Brazil: encompassing several games, gamers and ways of play, as well as on the micro level: as nationally distinct cultures of anonymous game message boards (Elmezeny et al., 2018). When defined cultures overlap, like in our case, researchers should be careful in attributing characteristics to specific communities. However, through comparing cultures of interest (see 3.3 below) researchers are able to pinpoint where specific characteristics of each culture lie.

3.2. Investigating One or More Contexts

This step in the process involves investigating a context of game cultures that will be compared by the researcher. As mentioned earlier, each context entails specific observable phenomena and articulations of culture. The application of this framework means that researchers can choose to limit their comparison to one context, which provides a clear and straightforward approach to the comparative study. However, the indication of contexts does not always need to be limited to just one. The five aforementioned contexts are constantly affecting each other, and together they communicate game culture as a whole; hence, more than one context can be investigated at the same time. Researchers can compare multiple contexts across cultures, and while this approach is not limited to specific phenomena, it provides a systemization of the contexts of culture to be compared.

During the investigation of specific contexts, the researcher looks for articulations of culture within their compared samples. This includes looking at specific patterns within discourse, actions and classifications regarding a certain context of game culture. For instance, in investigating the identification context, a researcher can observe the specific actions, writing and arguments behind a player’s identification and membership within a certain game community. Hepp’s (2009) framework suggests that the comparison manifold span beyond just national semantics, and with these contexts, we have the ideal categorization for other comparative aspects beyond the territorial. Phenomena within the contexts of game culture can also manifest on a micro, meso or macro level (see Table 2). We suggest defining indica-

tions on these levels to simplify the comparative aspect addressed by the researcher. When looking at the context of production, one is not sure if they are looking at the production by game companies, user-generated content, or cooperative work. Through specifying which contextual level is addressed, researchers can pinpoint their research interest to be compared and standardize it across cultures.

For our previous study comparing two nationally distinct online gaming communities, we investigated their trolling behavior through a content analysis of message board posts on similar forums (chans) (Elmezeny et al., 2018). Since we were interested in ‘trolling’ behavior specifically, we limited our investigation to two specific contexts of these cultures: appropriation and representation. Appropriation was selected because it relates to the question of how gamers behave and utilize game content online, and representation because it shows how certain topics are handled and received in public discourse. These phenomena manifest on a meso (community habits and representation in specific channels) and micro level (personal habits or rituals).

3.3. Comparing Investigated Contexts

Once the researcher has investigated the contexts to be paralleled for each game culture, they can begin their comparative analysis. Initially, the researcher should start by preparing the comparison manifold. This includes structuring the data into social units, whether looking at data from individuals, organizations or other equivalent entities. Moving forward, the researcher then begins to compare the different cultures by noting and analyzing cultural patterns. During this step, Hepp suggests to take care in answering whether a certain pattern is “national specific, transculturally stable or characteristic of a deterritorial community” (2009, pp. 11–12). This means contextualizing the results of the comparison within various and potentially different cultural commonalities. These commonalities could relate to territorial levels (local, national, global characteristics, etc.) or on a non-territorial level (different kinds of games or genres).

To avoid a self-serving, normative perspective, Hepp proposes, “focusing on the construction processes of cultural articulation” (2009, p. 11). To do so, it is important to observe how the noted cultural patterns assist

Table 2. Manifestations of contextual phenomena on various levels.

Level/Context	Production	Regulation	Identification	Appropriation	Representation
Macro	Industry production	Industry standards	Overall cultural identity	Cultural features	In mass media and public discourse
Meso	Cooperative development	Subculture rules	Community or clan identity	Community habits or rituals	In specific mediums or channels
Micro	User generated fan content	Individual/ Self-regulation	Personal Identity	Personal habits or rituals	In specific games or game related publications

in the construction of the game itself. This construction by cultural patterns leads the culture (and the game itself) to be centered around different aspects, whether territorial aspects (with national game cultures) or non-territorial aspects, such as a specific game or shared interest. It is also essential to focus on how the cultural patterns analyzed relate to hierarchies of power (Hepp, 2009). Power relations within game cultures should be noted, such as instances of dominance or other hierarchies, since games and their cultures provide an interesting environment for power struggles to manifest.

It is important to note that during the comparative process, the researcher can also observe phenomena that are not centered on power relations. Should the researcher be interested in more communicational or appropriation aspects of the culture, they are free to pursue these patterns instead. For our previous study comparing trolling in Russian and Brazilian online gaming culture, we primarily compared topics and situations that instigated trolling, as well as strategies, or types of trolling (Elmezeny et al., 2018). Using existing literature on trolling, we constructed a codebook for the qualitative analysis of board posts, and once we analyzed an equal number of posts from both communities, we compared our findings to find commonalities and differences between both game cultures. Still, we find Hepp's point of looking at relations of power relevant to other phenomena. For example, for those who are interested in comparing the representation of certain topics in two game cultures (such as depictions of a specific gender or violence against certain groups) should make considerations for power-relationships. A researcher can do this by analyzing the connection between the publishing company's acceptance of certain topics or how members of the game culture perceive them.

3.4. *Placing Game Cultures on a Transnational Spectrum*

In our framework, we address gaps in media and game culture research by assuming that these cultures are neither totally national nor international, and that they share some of both characteristics. Hence, we suggest that once the comparative study has been completed, the researcher should place the analyzed game cultures on a transnational spectrum, with one end labeling cultures as nation-specific as possible and the other as transcultural as possible. This step in the process is optional and suggested for those comparing game cultures on a territorial basis. For the comparison of micro cultures based on a specific game, or meso cultures based on players or methods of play, the spectrum can be adapted with non-territorial labels. This means that one end of the spectrum characterizes the culture with unique features that are not applicable to other game cultures, while the other end labels the culture as sharing qualities with others.

For those comparing national game cultures, it is important to remember that the decision for a culture be-

ing ultimately national or transnational should be based on more than just similarity to country stereotypes. For example, what makes a game culture of Germany localized is not the punctuality of their members, but manifestation of certain phenomena not existent in game cultures found in other countries. By avoiding comparisons to national stereotypes, researchers can prevent faulty labels and generalizations. Nevertheless, certain descriptions have to be stated on what makes a culture national or not. In our perspective, it is more beneficial to analytically explain (and state) descriptions of what makes a culture localized to a specific country, than to attribute them to national stereotypes. In the case of our study comparing trolling in Russian and Brazilian online gaming cultures, we did not contrast our findings with national stereotypes, but with each other instead (Elmezeny et al., 2018). Once we had done that, we were able to pinpoint aspects that existed in both cultures, such as similar trolling strategies or responses to certain topics. After finding a large number of similarities in the trolling methods of both communities, we concluded that the nationally distinct game cultures should be placed more towards the transnational end of the spectrum.

4. Discussion and Outlook

In this article, we presented one possible procedural method that can be utilized in the comparative study of digital game cultures. Building on Hepp's (2009) framework for the comparative study of media cultures, we address gaps in his work, as well as in comparative games research, through providing additional steps that help define terms and certain aspects in the comparative pursuit of game cultures.

It is important to note that this is not the only way to conduct a comparative study of game cultures and that there exists other appropriate approaches and perspectives. While our framework is not the only method of studying game cultures comparatively, it provides analytical advantages geared for game studies. Initially, the use of game culture contexts provides a well-rounded and inclusive analysis. This is especially true for researchers investigating more than one context at a time, who are able to observe several related phenomena and their influence on each other. For those who are interested in only one context, the framework assists in the proper and precise definition of the research object. Having a well-defined research object helps the researcher in a more balanced comparative analysis, while at the same time, stops the researcher from becoming overwhelmed. Finally, the application of this framework allows the researcher to utilize theory from several other disciplines based on their research interest, equipping them with more analytical tools and a greater body of literature to relate their findings.

The merits of a comparative game culture analysis are plentiful. For one, the transcultural perspective helps in making "very different power-related processes of cul-

tural articulation accessible in a critical manner” (Hepp, 2009, p. 12; see also Kraidy, 2005). Comparing territorial game cultures will also allow us to observe the existence (or absence) of a global game culture. Should national cultures share several characteristics, it can lead to the assumption of the existence of a global culture not bound by any territorial borders. Or alternatively, it can label game cultures as a cultural cross-section similar to folk, high or urban culture: existing globally but with different local manifestations.

Ultimately, looking at game cultures comparatively provides us with the opportunity to note specific characteristics of each culture and how they relate to meta-processes such as mediatization, globalization, individualization and commercialization. Not only can comparative studies provide us with empirical cases observing these social transformations, but they can also provide insights on the nature of the relationship between them and the creation, lifetime and death of games and their cultures.

Conflict of Interests

The authors declare no conflict of interests.

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Article

***Psychasthenia Studio* and the Gamification of Contemporary Culture**

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Abstract

What does it mean to say that Games Matter within a new media art context? Conversely, what contributions can artists and scholars exploring the medium make to the cultural conversation around their use and meaning? This contribution highlights the ways in which our interdisciplinary art collective, *Psychasthenia Studio*, has addressed the cultural effects of games and gamification as they have evolved over the last decade, using a series of videogame art projects as the medium of expression and critique. As Mary Flanagan (2009) suggested in *Critical Play*, “games carry beliefs within their representation systems and mechanics” (p. 4). Through their thematic content and interaction design, the three videogames developed by us in the interdisciplinary *Psychasthenia Studio* between 2009–2017 draw attention to those beliefs as they exist not only in the games themselves, but also more broadly in an increasingly gamified contemporary culture. *Psychasthenia Studio* simultaneously intervenes in the discussion around games in society and pushes the boundaries of what constitutes new media art practice today. By playing the *Psychasthenia* games, our hope is that users both co-author and witness their own participation in the system.

Keywords

activist games; critical play; game studies; gamification; installation art; new media; psychology; subversion; videogames

Issue

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1. Introduction

What does it mean to say that Games Matter within a new media art context? Conversely, what contributions can artists and scholars exploring the medium make to the cultural conversation around their use and meaning? The cultural conversation around games has moved beyond concerns over their anti-social effects or status as mere entertainment and explores their value and impact. Within that framework, this contribution highlights the ways in which our interdisciplinary art collective, *Psychasthenia Studio*, has addressed the cultural effects of games and gamification as they have evolved over the last decade, using a series of videogame art projects as the medium of expression and critique. As Mary Flanagan (2009) suggested in *Critical Play: Radical Game Design*, “games carry beliefs within their representation systems and mechanics” (p. 4). Through their thematic content and interaction design, the three videogames we have developed in *Psychasthenia Studio* between 2009–2017

draw attention to those beliefs as they exist not only in the games themselves, but also more broadly in an increasingly gamified contemporary culture. In our games we strive to show the effects that gamification has on personal identity, agency, and self-definition, and the extent to which the avatar identities we produce through gamified personal and professional interactions are dependent upon pre-existing structures of meaning and value. By taking advantage of the affordances of the game engine to communicate its ideas, *Psychasthenia Studio* simultaneously intervenes in the discussion around games in society and pushes the boundaries of what constitutes new media art practice today. By playing the *Psychasthenia* games, our hope is that users both co-author and witness their own participation in the system.

2. Games, Gamification, and Contemporary Culture

In 2005 Jesper Juul concluded his study of the *Half-real: Video games between real worlds and fictional worlds* by

saying that though “the fictional worlds of games are optional, subjective, and not real, they play a key role in video games. The player navigates these two levels, playing video games in the half-real zone between the fiction and the rules” (p. 202). More than a decade later, the fictional world of games is converging with the real.

Gamification, or the process of introducing game elements into real world activities, has also taken hold in business, industry, and education. Researchers in the social sciences and education take an analytical approach to games and gamification, studying the reward structures of games themselves, or the impact of games on cognition, learning, attention, productivity, and motivation. Points systems, badges, and curation of competitive communities online had already emerged by the early 2010s, bolstered by books discussing the benefit of videogames and gamification to encourage achievement. Karl M. Kapp’s *The Gamification Of Learning and Instruction: Game-Based Methods and Strategies for Training And Education* (2012) centered on the creation of engagement. The MacArthur Foundation, Mozilla, and the Bill and Melinda Gates Foundation funded a 2011–13 *Digital Media and Learning* competition focused on badges for learning; Mozilla subsequently set up a micro-credentialing system that continues to be adopted (HASTAC; Mozilla). This gamification processes also extends into the creation of individual identities online through social media and the open-ended quest for more hearts and likes and followers. Apps like FourSquare and FitBit build in competition as a matter of course. Jane McGonigal helped move gamification research into everyday life in celebratory fashion though her influential book *Reality Is Broken: Why Games Make Us Better and How They Can Change the World* (2011) and her research-driven follow-up, *SuperBetter: A Revolutionary Approach to Getting Stronger, Happier, Braver, and More Resilient* (2015). In both works she argues the value of gamifying everyday life through points systems, competitions, and quest goals.

During this same period, critical game studies and new media art games have evolved in parallel, and at times in dialog with, these developments, offering critiques of the instrumental use of games, while at the same time exploring the emerging medium’s expressive potential. The term “gamification” often implies a critique of an increasingly pervasive phenomenon, “the use of game design elements in non-game contexts” (Deterding, Dixon, Khaled, & Nacke, 2011, p. 10). The darker sides of this development, as noted earlier, are what the *Psychasthenia Studio* team intentionally parodies. This follows upon a more general “ludification of culture” that we expose in our creations (Raessens, 2006, p. 52). Yet, as noted by the editors of *The Gameful World: Approaches, Issues, Applications*, gamification also represents “the most recent and visible instantiation of the interpenetration of games with everyday life (Walz & Deterding, 2014, p. 6). Games themselves are not new, nor is their instrumental use for education and training, advertising, art, or

entertainment. We are experiencing a cultural moment in which they are highly visible, in part because new technologies are making it more possible for a wider range of actors to participate in their creation and use.

Some critics engaged with the discussion over games and gamification, are also hybrid practitioner-critics. Jane McGonigal, Ian Bogost, Noah Wardruip-Fruin, and Mary Flanagan, among others, both study and produce games of various kinds as a natural extension and complement to their written work. This ability to move between the critical and creative realms lends an extra dimension of insider understanding to their critiques of games and gamification. Bogost is known both for explaining “Why gamification is bullshit” in the context of an increasingly diffuse set of business practices adopting game-like attributes, and for his own compelling series of *Persuasive Games*, like the *Killer Flu* game he distinguishes from the pseudo-game hype of corporate consultants (Bogost, 2014, p. 70). In addition, activist games like *Darfur is Dying* by Take Action Games is one of many at Games for Change (from interFUEL, 2006), which strives to educate through meaningful gameplay. Meanwhile, the Radical Games of *Molleindustria*, which describes itself as producing “artisanal remedies to the idiocy of mainstream entertainment in the form of free, short-form, online games, include “simulations” like the satirical *McDonalds* and *Oligarchy* games (Pedercini).

The creation of complex, 3D immersive games is becoming increasingly accessible as a medium of expression for artists and critics. Videogame play capture and machinima (movies produced from game footage) are not new, as Henry Lowood and Michael Nitsche and others have noted (Lowood & Nitsche, 2014), and mods and hacks have enabled gamers to change up in-game experiences in ways that are increasingly anticipated by the game companies. Beyond that, as videogame platforms like Unity3D and Unreal have become more accessible and affordable, the independent game world continues to increase in size and diversity. The huge Valve Corporation Steam game distribution platform, for example, provides a clearinghouse for distributing a wide range of games, including those by independent developers, and, importantly, older titles (STEAM Store). A number of new media artists now use videogame engines behind the scenes to fuel their installation art, and immersive, 3D games are also of growing importance in the cultural heritage and museum contexts. Such uses bring up questions related to simulation, truthfulness, representativeness, among others. This does not touch upon the convergence of social media and virtual reality happening with Facebook’s acquisition of Oculus Rift, and Apple and Google’s forays into social augmented reality. In short, complex, immersive gamified experience design that blurs the boundaries between the real and the virtual is an important growth area for the intersection of social media with game technologies, potentially leading to the further gamification of everyday life (Graham, 2017; Kaplan, 2015).

This combination of broad cultural interest, a rich critical landscape, and increasingly accessible authoring technologies provides a great opportunity to new media artists interested in the medium's potential. John Sharp described the intersection of the game and art worlds in *Works of Game* (2015), issuing an implicit challenge:

Game art (art made from games) uses games for the thin aesthetics of symbolic expression in service of the thick aesthetics of conceptual exploration. Artgames take a more conservative approach of emphasizing representational expression in a thick way, at the same time that they thinly explore the conceptually and critically focused aesthetics of contemporary art. But what happens when an artist combines the thick aesthetics of both communities to produce an artists' game? (Sharp, 2015, p. 78)

Sharp distinguishes between game art, which uses game tools art artistic effects, and artgames, which are conceptually interesting from the game perspective but which to the art community are less interesting for their "emphasis on craft and medium" (p. 78). The aspirational third term in his analysis is the artist's game. The artist's game, Sharp suggests, is a game that both takes full advantage of the technological affordances of the medium and engages in the richness of conceptual art. By producing work that is as much about the medium and its potential as it utilizes its effects, with the *Psychasthenia* series we attempt to create artist's games. We push into the thick aesthetics of game-world conventions and interactions, while at the same time exploring new ways to aggregate disparate visual elements in 3D, to introduce non-representational visuals into mundane, relatively low-poly game spaces, and to point out the gamified nature of the social phenomena we parody.

Artists' games, Sharp suggests, are often collaboratively produced. This may be necessary in a medium that is so complex technically and can encompass elements of so many others in its execution. This principle collaboration also extends to a shared notion of authorship that is inherent in the idea of play (p. 81). For us, both kinds of collaboration have been essential. As team leads, our backgrounds are in the arts and humanities. We have both spent many years in academic settings studying, working with, and teaching emerging technologies from artistic and scholarly perspectives. Our extended collaborative community includes programmers and engineers and students, as well as social and professional networks in the new media art, digital humanities, and computer graphics worlds. The audiences who play with our games bring to them very different expectations, depending upon the context in which they encounter them, and provide sometimes contradictory feedback. Gamers tend to want to play through very quickly, and to see any points values accumulate on a heads-up display. Artists tend to explore the game settings as virtual installations, and sometimes need prompting to move forward with in-

game challenges. In our use of the videogame medium we strive to be legible to both the experienced gamer and the art patron, but most importantly, our goal is to produce a flare of awareness and recognition of how the "ludification of culture" manifests in everyday life, and to highlight the ways in which we co-produce its effects with our actions.

3. Psychasthenia Studio

It is this complex set of circumstances and concerns that animate our work in *Psychasthenia Studio*. In keeping with the hybrid critic-producer tradition, the *Psychasthenia Studio* games enact critique through gameplay. The series is not, however, about shutting down games as a communications medium, but rather activating it to a fuller potential. Most of our work in *Psychasthenia Studio* has been produced using the Unity3D game engine and has been shared both in the context of new media art exhibitions and demonstrations, either as a standalone experience or as part of a new media art exhibition, as well as through academic conferences and gatherings. While the focus of our team is on exploring videogame engines as a medium of expression, the work itself often takes on a distinctly dystopic edge, critiquing the ubiquity and power of games in contemporary culture, even as it uses game mechanics and conventions to explore its subjects.

Psychasthenia Studio is led by Joyce Rudinsky, a new media artist, and Victoria Szabo, a visual and media studies scholar. As noted earlier, we come from arts and humanities backgrounds, and work closely with programmers when needed for some aspects of implementation. The *Psychasthenia* series of games was begun as an experiment for the first *Collaborations: Humanities, Arts & Technology Festival* in the North Carolina Research Triangle, which was held in 2010 in the University of North Carolina, School of Information and Library Science (UNC-SILC). This regional festival was part of a conscious effort to bridge the arts and sciences and involved partnership with the North Carolina Renaissance Computing Institute (RENCI), a state organization dedicated to translating university computing research into other contexts, the University of North Carolina at Chapel Hill, Duke University, and North Carolina State University. RENCi provided resources and personnel to work with computational media technologies, including game engines and a virtual reality system, while members of the arts and humanities communities came together on experimental projects ultimately showcased at the CHAT Festival.

Our team adopted the theme of "psychasthenia" early on to describe the effects that their work produced. Psychasthenia is an archaic psychological term, and describes a condition characterized by "obsessions, compulsions, abnormal fears, and guilt and indecisiveness" (Comer, 2010, p. 97). The term is associated with the psychologist and philosopher Pierre Marie Félix Janet, who distinguished it from hysteria and described it as a fail-

ure of the *fonction du réel*, or the function of the real, in *Les Obsessions et la Psychasthénie* (Janet & Raymond, 1903). The term was fitting for our team’s interest in the unstable boundaries between the real and the virtual, and the psychological effects of that ambiguity as they play out in videogames and the wider world. Jesper Juul has described the classic game model as “the game itself, the player’s psychological relation to the game, and the relationship between the playing of the game and the rest of the world” (Juul, 2005, p. 197). This tripartite understanding of games and gameplay helps us articulate how we constructed situations that simultaneously participate in game conventions and draws the user’s attention to them in the process of moving through the game. The following discussion will highlight each of these aspects as they relate to the three games being considered. Each game we developed in the 2009–2017 period reflects a moment in the evolution of the broader gamification discussion, as well as in what was possible with games-based new media art.

4. *Psychasthenia 1* (2010)

The first *Psychasthenia* was a videogame installation that involved exploration of surreal landscapes and environments, as shown in Figure 1, while wearing a biometric sensor helmet in an immersive, 15’ virtual reality dome, as seen in Figure 2. Our production team all wore white

doctor’s jackets as they assisted users into the work, making the installation a performance as well as a VR-based experience. Moving through a curtain into a contained space, users waited their turns to put on a helmet and game controller, waiting to be guided through the experience. As the project description states:

Psychasthenia is an immersive artwork that operates allegedly as a psychological diagnostic environment, though actually functions as a mediation and critique on the twin phenomena of disempowered self-diagnosis and the cultural pathologization of ordinary lived experience. The term psychasthenia, now deprecated in psychiatric literature, though still used in some therapeutic instruments, describes a neurotic state characterized historically by so-called mental weakness and lack of motive force. The irony of the piece is that psychasthenic symptoms pervade contemporary culture: we are all psychasthenics caught up in our own ills, real and imagined. The bewildering array of causes, theories, and cure the user encounters only heighten the sense of powerlessness diagnostics can provoke. (*Psychasthenia 1*, 2010)

Users answered psychological test questions based on the Minnesota Multiphasic Personality Inventory, though modified to suit the game’s tone and slant. These were interspersed within increasingly abstract and fore-



Figure 1. Still from *Psychasthenia 1*. Courtesy of the authors.



Figure 2. Still from *Psychasthenia 1*. Courtesy of the authors.

boding scenes, including claustrophobic tunnels, amorphous figures lurking in cells, and a twisting corridor peopled by grimacing patients subjected to galvanic facial contortions. After making it through the game world, which adapted to the head movements of the user by affecting lighting, tunnel size, and so forth, the user was inevitably “diagnosed” as suffering from “psychasthenia”. The in-joke was that there was no way out; the end-diagnosis was an inevitable condition of participation. The question was merely how one arrived there, and how much worse the condition became over the duration of the experience of “diagnosis”.

Perhaps the most notable feature of the installation was the extent to which people did not know how to respond to it. They could not tell if it was “real” or not. Users were hesitant to enter, some asking us if they needed to sign a disclaimer (we did not go so far as to require them to do so). They wondered aloud whether and how the sensor-helmet was having an influence on what they saw, and whether they were in danger of receiving shocks or other stimuli from it. This ambiguity may have been heightened by the fact that the piece was shown as part of a festival that was not only about new media art but also other innovative uses of technology, and by the then-novel technological apparatus used in the presentation, the VR half-dome. We also created the project at a time when the videogame *America’s Army* (Mezoff) had just been updated as a first-person shooter on the Unreal engine in 2009, prompting substantial local discussion. As with *America’s Army*, the fact that the game was used for both recruitment and training heightened a sense of ambiguity about how and why one would enter a “diagnostic” game space, and what those After Action Reviews might really be tracking.

5. *Psychasthenia 2* (2012)

While *Psychasthenia 1* diagnosed the malady, *Psychasthenia 2* claimed to treat it as we exemplified by the doctor’s office setting shown in Figure 3, and the curative shopping spree undertaken by the user to meet basic needs, as shown in Figure 4. This project was introduced at the second CHAT Festival, at Duke University in 2012, as a standalone experience within a new media art gallery. We began the game with the goal of elaborating on concepts from the first piece, and by thinking through how to create a more tightly structured and coherent narrative experience that would push on the idea that game spaces could be used as treatment environments. Unlike the first game, this iteration was not dependent upon the immersive dome, and could be played without assistance. It shifted the conversation away from the idea that the game was pushing the user towards psychasthenic suffering in order to explore the idea of a gamified treatment regime. The game picks up where *Psychasthenia 1* left off:

The “patient” entering the *Psychasthenia 2* environment first encounters a classic video game orientation narrative, which provides contextualization on the user’s role and overall experience in game play. The “patient” entering the installation learns upon entry into the system that he or she suffers from psychasthenia. He or she must then explore palliative measures keyed to Maslow’s hierarchy of needs—physiological, safety, love/belonging, esteem, and self-actualization. These stages of self-actualization are organized as game levels to be mastered in order to win release from the asylum. The specific nature of the patient’s

pathology, refined by feedback from user input and in-game tracking, shapes his or her experience of the work, as well the options ultimately offered to maintain a tolerable existence.

After orientation the patient finds him/herself in a stark hospital room. With only a whirring fan for company, the patient begins the journey to self-actualization by exploring the opening environment using a video game controller. Soon he or she triggers their first encounter with Dr. Carl Abraham, the psychologist who will guide him or her through their journey to wellness. Dr. Carl appears in-world on a display screen in the patient's room. Throughout the installation he functions as a semi-omniscient, scientific analyst whose remarks simultaneously humanize the treatment process and suggest an uncanny alienation from human individuality. His opening remarks guide the patient toward the diagnosis room, a maze of file cabinets where the patient can find out more about his or her illness by exploring the resources available.



Figure 3. Still from *Psychasthenia 2* website. Courtesy of the authors.



Figure 4. Still from *Psychasthenia 2* website. Courtesy of the authors.

Soon the patient is led towards a computer terminal where the first round of testing will begin. At this point the journey begins with questions related to Maslow's "physiological" stage popping up to help refine the player's diagnosis and experience of the therapeutic "level" to follow. Now gameplay begins in earnest, as each game level corresponds to both a classic style of video game play and to a stage in Maslow's hierarchy. Dr. Carl introduces each level, following up with some questions tailored to the symptomology to be addressed. The physiology stage couples a shopping experience with exploration of an open-ended set of options. Basic biological needs met, the patient then progresses towards the "safety" stage where the patient must encounter his or her primal fears through the experience of killing various monsters that crop up on the way to treatment. The third stage, love/belonging, becomes a social challenge, with the patient determining which kinds of social relationships will best assuage their symptoms through interactions in a coffee shop. Social needs met, the patient next challenge is building up the esteem of peers, expressed here through workplace challenges set in an unusual office environment. Finally, self-actualization achieved, Dr. Carl sends the patient on his or her way, with admonitions to follow the treatment plan and an ominous warning that the door is always open for return.

Throughout the "game" levels the player always has the opportunity to examine contextual information about his or her illness, meta-commentary on psychasthenia itself, and imagery and other media which enriches the experience of any particular level in the "game". These elements, akin to the explanatory texts served in a quest-based game, serve both to deepen immersion in the gameworld mechanics and to frame the current challenges in historical and social contexts. Because the patient periodically encounters and answers additional questions relating to the specific nature of their "condition", the system is able to provide supplemental feedback tailored to their particular flavor of pathology. This aspect of the game experience is critical, because the installation is not just about one-way production of consumer subjectivity, but also about how algorithmic, participatory culture generates all-the-more compelling narratives of pathology in need of standardized routines of intervention. (*Psychasthenia 2*, 2012)

The idea for *Psychasthenia 2* was predicated upon the emerging assumption that videogames could actually be beneficial, not just productive of darker human tendencies. We noted that arguments about the likelihood that they would produce violent behavior in adolescents were beginning to become more nuanced. As the American Psychological Association stated in a 2010 press release, "playing violent video games can make some adolescents more hostile, particularly those who are less

agreeable, less conscientious and easily angered. But for others, it may offer opportunities to learn new skills and improve social networking". We wanted to explore this idea of the hidden power of videogames, for good or for ill. This was simultaneously alarming and reassuring. Kids with the right OCEAN 5-factors personality attributes (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) would be fine, while others might be made worse (American Psychological Association, 2010). At the same time, books like *What Videogames Have to Teach Us About Learning and Literacy* by James Paul Gee (2007) explored cognitive development through games, providing some nuance and valorization of a previously denigrated medium.

The game elements included here also reflect then-current discourse around gamification, as noted earlier. In *Psychasthenia 2* we included digital badges, for example, to track progress in-game. Users navigating the social level had to pick up badges for love and belonging, family, and religion before they could proceed to the next level of the self-actualization journey. The badge categories themselves reflected what we called, using intentionally esoteric language, a "palliative measure", or treatment strategy, that had been prominently cited in the nineteenth and early twentieth-century literature about psychasthenia, drawing upon the work of William James, Carl Jung, Janet, and others for inspiration. The character of Dr. Carl Abraham, who appears on a video screen

as a rather overbearing guide in the user's psychic journey, refers both to Carl Jung and Abraham Maslow, and also to the then-current fad for virtual assistants, that is animated chatbots, here generated from Voki bots with animated elements.

The other notable aspect about *Psychasthenia 2* for us was that it was well received as new media art. It was selected for the *Currents New Media Festival* in 2013, where it was installed in its own "doctor's office" (*Currents*, 2013). At *Currents* it was set up as an online diagnostic and treatment environment, with its own separate cubicle, complete with a doily-covered couch, a floor lamp, and wall art taken from scenes in the game itself (Figures 5 and 6). All of these props were designed to blur the boundaries between the 3D game space and real life. The user reclined on the couch and uses an ordinary game controller to navigate the system in privacy, interacting with Dr. Carl throughout the journey to self-actualization. In this way we moved from the futuristic setting of the VR half-dome and into a semi-plausible treatment environment that invoked an individual therapist's office.

Psychasthenia 2 was shown in other juried new media venues as well. This acceptance of the work as new media art was a breakthrough for us, in that the first piece, *Psychasthenia 1* was understood and appreciated more as a technological experiment than as an artwork in itself. It required a specialized setup and



Figure 5. Installation photo from *Psychasthenia 2* website. Courtesy of the authors.



Figure 6. Installation photo from *Psychasthenia 2* website. Courtesy of the authors.

equipment and relied upon us as presenters to complete its performance of gamified psychological diagnosis. However, it also did not fit game venues where high powered graphical innovations or sophisticated algorithms might have lent it more legitimacy. The innovation was in the creative use of game engines, not the extension of the technology itself. With this piece, we wanted to create something that could operate easily as a new media art installation without specialized knowledge or assistance. We wanted the technology to become more naturalized into the experience and did so by relying on the similarity between the couch of the traditional therapist's office and that of the at-home gamer.

Ultimately, *Psychasthenia 2* was designed as a commentary on what constituted self-actualization, at the same time as it asserted its status as an optimal tool for personal growth. At the same time, the ongoing withering commentary from "Dr. Carl" helped establish it as satire; self-actualization culminating in a formless after-life, with a hint of reincarnation into the same awful coil implied by the game's restart mechanism. In this we strove to highlight the difference between the typically low stakes of the computer game world and those of everyday life.

6. *Psychasthenia 3: Dupes* (2017)

Psychasthenia 3: Dupes took the advances we had made with *Psychasthenia 2* as an art intervention further, continuing the theme of paralleling gameplay with lived experience in gamified everyday life, as takes place, for example, in the workplace breakroom environment shown in Figure 7. We also brought back some of the genre ambiguity of the *Psychasthenia 1* dome-based performance by creating games within games, where it is unclear where the boundaries lie, or the subject-position of the user within that system.

Psychasthenia 3: Dupes is ultimately about how we can retain awareness of the narrow-casted nature of our everyday lives in the face of ubiquitous data-collection, analysis, and digital remediation of everyday life (*Psychasthenia 3: Dupes* Trailer, 2017). The game draws upon challenging workplace relationships and gamified assessment environments, revealing the ubiquity of data shadow construction, the erosion of personal privacy, and the amplified power of the external instantiation of an avatar self. We set it in a dystopic, yet banal, workplace office setting, where every interaction, whether "in person" or online, is logged and judged against a series of internal evaluation factors. These success factors are in turn revealed at the end of the game in the form of a comprehensive Success Report, which resembles a credit report in its presentation and measures, and which forecasts your ultimate workplace fate.

The seeming premise of the game is that the user must complete an HR personality test before the end of a game-world workday. However, the user is continually interrupted with other demands. Just as the user settles into the test, a notification screen pops up on the virtual computer. This begins a sequence that repeats throughout the day—a series of interruptions as you complete your quest...to finish the quiz. Over the course of the day the user visits the company shrink, attend a staff meeting, stop by the communal water cooler, and is summoned for a meeting with the boss, following by a dispiriting trudge back to a lowly basement cube. During these side trips, the user's interactions with archetypal co-workers are secretly logged, the interactions themselves ultimately playing a critical part in building up the "success" profile revealed at the end of the game.

Like *Psychasthenia 1* and *2*, in which we used an altered version of the Minnesota Multiphasic Personality Inventory to "diagnose" and "treat" the user's condition, *Psychasthenia 3: Dupes* is structured around a psycholog-



Figure 7. Still from *Psychasthenia 3: Dupes*. Courtesy of the authors.

ical test. Here the overt action of the game is based on popular OCEAN test's Five Factors of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. They are re-imagined within the context of the workplace "Success Index" as Gullibility, Grinding, Gladhanding, Subjugation, and Internalization. The questions the user is to attempt to answer throughout the day correspond to these categories.

We designed each character encountered within the game to reflect a different workplace archetype: The Psychotic, The Artiste, The Narcissist, The Celebrity, The Sophist, The Bombast, The Charismatic, The Dominator, The Ingenue, The Shopper, the Sycophant, the Melancholic, and the Egoist. Interactions with each character reveals his or her core attributes, with the user's possible responses becoming increasingly limited as the day

goes on. Declining the engagement is not an option, and user responses to character interactions factor into the ultimate HR test results, as does a Collusion score based on the length of interaction with each. The characters the user interacts with are 2D poster collages rather than "realistic" 3D figures, and the user's size and location vary based on responses to their characters—all qualities adding to the destabilization of any realist assumptions one might bring to the game. During the endgame, these archetypal figures recombine into a modern-day Tarot, augmenting and illuminating the Success Index ostensibly compiled from the formal test.

The system reveals the characters representing the user's Spiritual Twin and Nemesis, as shown in Figure 8, as well as numerical Success Index broken down with pie charts, as shown in Figure 9, and a final Fate card. The



Figure 8. Still from *Psychasthenia 3: Dupes*. Courtesy of the authors.



Figure 9. Still from *Psychasthenia 3: Dupes*. Courtesy of the authors.

Tarot allusion is both a reference to the 19th century occultism that existed alongside some of the foundational elements of modern psychology, and a commentary on the legitimacy of the measurement instruments we deploy today.

We designed the user’s experience of the game to conflate the relationship between the individual playing a game and everyday work life. The game begins with the sound of coffee pouring into a cup. The screen fades in to reveal an empty computer monitor, in-world in what appears to be a standard office cubicle. A digital clock advances. Gameplay only begins with the movement of the mouse. This simple choice establishes kinesthetically a relationship that we strive to exploit throughout gameplay—the blending of the experience of playing the game with the action you are taking in our fictional world.

When at the keyboard in the cube, the game user clicks on submit buttons to interact with the screen. This is a deliberate counterpoint to the current trend of increasingly immersive videogames, from the Wii onward, that use motion tracking, VR headsets, force feedback controllers, and other tools to effect changes of perspective. In a moment that feels more akin to using Windows Remote Desktop to get into a workplace admin system but is actually the logical conclusion of fully-formed VR simulation of everyday life, the game player and the avatar are united in purpose and experience.

In *Psychasthenia 3: Dupes* we reflect the preoccupations of gamified internet culture in several ways relevant to its 2017 debut. The pompous doctor’s innovative “new method” resembles nothing so much as a BuzzFeed quiz (see Figures 10 and 11). Several of the subsequent char-



Figure 10. Still from *Psychasthenia 3: Dupes*. Courtesy of the authors.

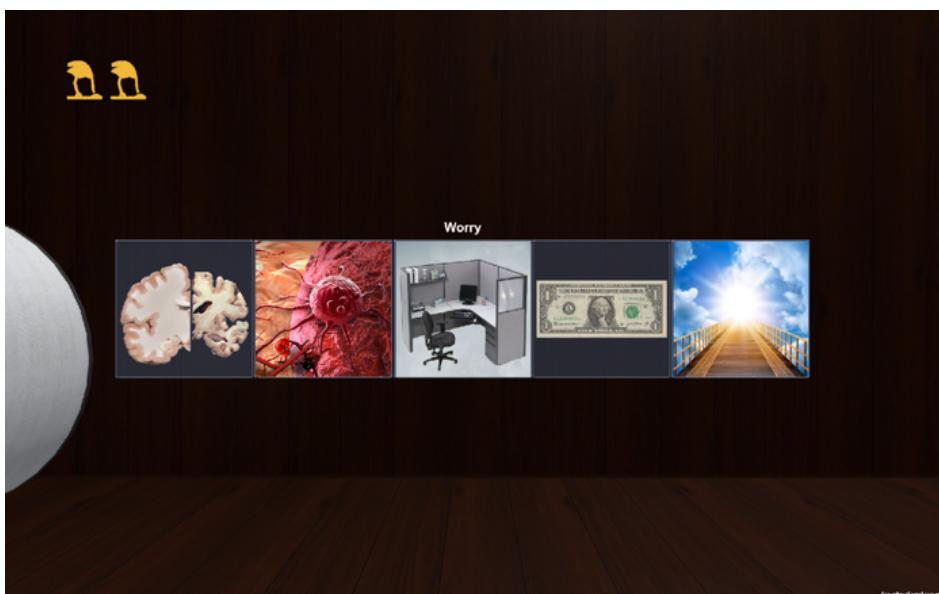


Figure 11. Still from *Psychasthenia 3: Dupes*. Courtesy of the authors.

acters reflect gamified social media types: the Celebrity proudly aggregating hearts in response to an increasingly disturbing set of selfies; the Narcissist equating his low resting heartrate with personal excellence; the Bombast spouting nostrums modeling on a nonsensical text generator as an approving glow accumulates around her from the watching fans. The conference room, meanwhile, is decorated with carnivorous predators gleaned from image searches, and the breakroom is filled with mock “Successories”, as found in popular internet memes. The boss’ office is adorned with badges, and the user’s showdown with him includes his spittle splattering the view-screen, a reference to boss-level battles in Massively Multiplayer Online Role-Playing Games (MMORPGs).

In this game we strove to reveal gradually the estrangement of the holistic individual from authentic human experience. This conclusion is predicated on the assumption that nothing within the workplace remains out-

side the evaluation system. And, as the wide-ranging nature of the avatar interactions suggests, not much outside of that system exists at all. This “human” indirection within the game reveals the extent to which a gamified, logged quotidian experience becomes subject to exploitation and summary judgements re-appropriated into an evaluation matrix. Only the Psychotic, the conspiracy theorist who warns of constant surveillance, truly knows what is going on. By the time the workday ends, and you’ve found yourself back in your basement cubicle picking up your test results, you’ve already Accepted the End User License Agreement (EULA) proffered by your Dominator of a boss (see Figure 12) and are presumably resigned to whatever Fate the system personified by Dr. Carl declares appropriate, as shown in Figure 13.

Like *Psychasthenia 2*, we are presenting *Psychasthenia 3: Dupes* both in academic conference settings and demos, and as a new media art installation. It was se-

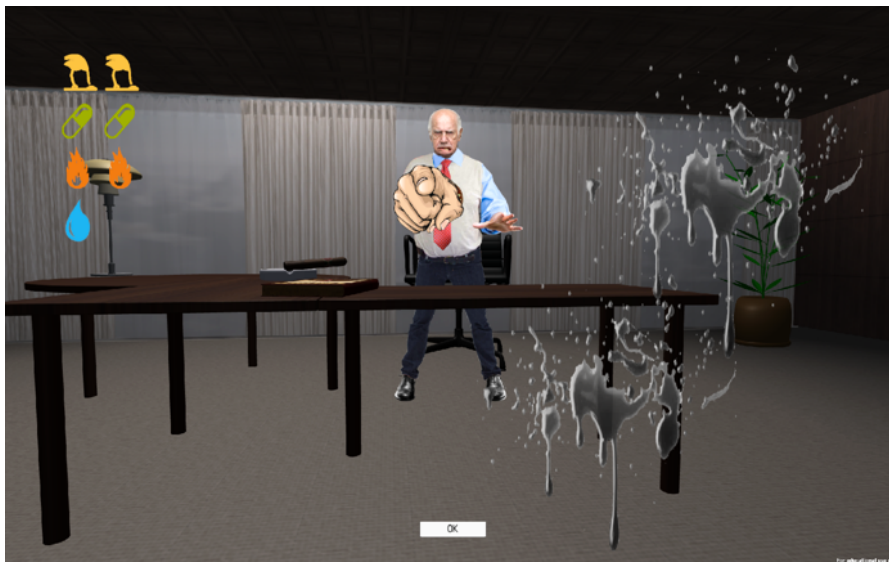


Figure 12. Still from *Psychasthenia 3: Dupes*. Courtesy of the authors.

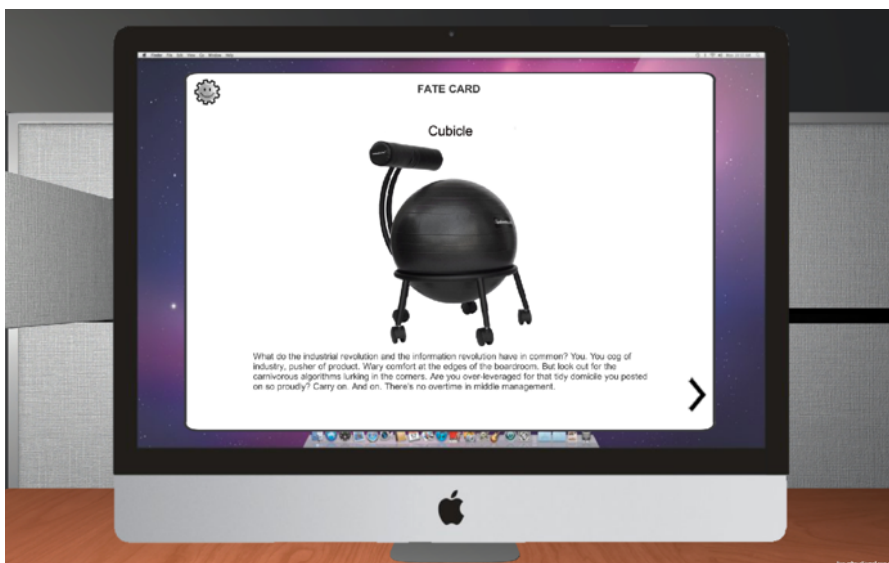


Figure 13. Still from *Psychasthenia 3: Dupes*. Courtesy of the authors.

lected for the Future Perfect show connected to the annual *Symposium on the Sciences and the Humanities: Intersections, Methods, Examples*, for example. This positioning marks it as an example of new media art produced in an academic context (Future Perfect, 2018). The fully installed version of the game is designed to look like a dingy cubicle in the middle of the art gallery space. The purpose of this juxtaposition is to highlight the constructed nature of our workday lives, to make visible the moment in which we are operating, where we travel to virtual cubes in order to do an HR test on a midrange computer terminal. Unlike *Psychasthenia 2*, which presented itself in a kind of doctor's office setting, in its fully installed form *Psychasthenia 3: Dupes* masks its intervention in a regressive series of windows not unlike what you see when you mirror back your own screen in a video-conference. It should be unclear to the user if they have wandered out of the gallery by mistake, and this game, unlike the others, will be available for download, potentially "dangerously" decontextualized for the unwary.

We produced *Psychasthenia 3: Dupes* in the context of a culture of increasing awareness of how surveillance and tracking technologies saturate our everyday lives, often with our consent, implicit or explicit, in exchange for the opportunity to communicate, shop, and research, both online and in the physical world. Bit by bit we accrete avatar or shadow-selves online, our avatar identities. Such federated identities both make our online lives easier and help shape the golem. This convergence of game culture and avatar-identity-formation manifests in the latest technologies being developed by social media, as noted earlier. This amalgam of these two elements—the rise of videogame culture and the coincident development of our data shadow avatar identities within the context of online media—emerged as an important critical focus for this game.

User response to the game so far indicates that we are succeeding in getting our goals across. One lingering concern we have is that after some users play through they tell us it is "depressing" and "true". We also use humor and creative visual efforts in our work, and hope that the relative simplicity of the game mechanics makes it easy to continue on, but also worry about losing the fun and playfulness of games. Perhaps in this way we are experiencing in the creation and reception of own work the tension between games and gamification, as well as the challenges designers of "serious games" encounter. As Alex Galloway has written of social realist games, *Psychasthenia Studio* games highlight the "congruity" between quotidian lived experience and the games themselves (p. 71), and to the extent that they are about the nature and consequences of gamification itself, they fall into that category. Ultimately, the goal of our work of *Psychasthenia Studio* is both to expose the workings of gamification in everyday life, and to explore how the affordances of game platforms can be activated by critical and creative artists.

7. Conclusions

This essay has described how emerging real-world gamification practices in education, industry, the military, and mass communications are reflected and critiqued in the artist's games we produced in the *Psychasthenia Studio* series. We consider the work of *Psychasthenia Studio* to be part of a transitional stage for games as art. The work is about the medium, and the message that the medium conveys. The *Psychasthenia* games have taken up Galloway's challenge in that they disrupt the relationship of the game to the world, and implicitly critique gameplay through the addition of intentional constraints. As Walz and Deterding (2014) ask, "What are the ethical ramifications of a societal panludicum—for policy makers, for designers, but also for individuals alternatively extending or replacing our will with technically mediated systems of goals?" (Walz & Deterding, 2014, p. 11). We intend for the work to function as an early warning system, pointing towards increasingly normalized—and sometimes uncritical—cultural shifts towards gamification and avatar-identities.

We hope that the *Psychasthenia* series, in its reflexive interest in gamification as a cultural phenomenon, helps point the way towards a more conscious appropriation, subversion, and transformation of emerging media trends related to games and gamification. The pervasive gamification of contemporary culture calls for much more critical response, as has been demonstrated in the growth of both game studies and the study of gamification as a cultural phenomenon. Over the years, our users have been surprisingly susceptible to believing the *Psychasthenia Studio* games are legitimate psychological tools, rather than satiric art, as noted earlier. As the game creators, this both delights and alarms us. This ambiguity may exist in part because of the uncertain stance of videogames in the art world, and in part because the games perform a kind of scientific legitimacy with their reliance on new media technologies. However much we may appreciate the effect as artists, this user credulousness is also worrying. The very plausibility of such gamified experiences as the next stage of cyber-human development suggests that even as we consider ways to use games to improve education, productivity, and communications, we also need to build up in diverse audiences a correspondingly robust culture of media literacy, reflection, and critique around their production and use.

Further, as *Psychasthenia 3: Dupes* hints at, and as the progression of the games' preoccupations suggest, concerns over the impact of videogames on society have given way to more complex engagements with the medium, and of gamification more generally. A decade ago, in "Counter gaming", Alex Galloway issued a challenge to create avant-garde games, that involve "radical action" and a critique of gameplay itself. He suggests that they "should reinvent the architectural flow of play and the game's position in the world, not just its map and characters" (Galloway, 2006, p. 125). The stakes

Galloway outlined are ever higher as the field of gameplay and gamification expands. Longstanding anxieties over the social effects of videogames have been joined with worries about, and speculations over, a wider range of computational media forms that increasingly interest the worlds of games and gamification: social media, filter bubbles, and artificial intelligence agents. These topics, along with deeper engagement with the potential of mixed and augmented reality systems to make the whole world a game, will likely animate our *Psychasthenia Studio* work on the next iteration of the series.

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Conflict of Interests

The author declares no conflict of interests.

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Article

The Persuasive Roles of Digital Games: The Case of Cancer Games

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Abstract

Using behavioral scientist B. J. Fogg’s conceptual framework on the role computer technology plays for users as a starting point, this article argues that persuasion through digital games can be approached from three different perspectives: digital games as media for persuasion, digital games as tools for persuasion and digital games as social actors for persuasion. In this article, I use five cancer gaming cases to illustrate how these three different persuasive roles can be used to accomplish different persuasive goals. In this respect, I explain how each of these persuasive roles digital games can play in the process of persuasion can serve to support cancer patients to face three different challenges: (1) lack of information about the treatment or the disease itself, (2) lack of motivation to start or continue with the treatment, and (3) difficulties in coping with the treatment or the disease. The analysis of these games is theoretical in nature and is done to illustrate my arguments. The categorization proposed in this article can be used as an analytical approach for the study of persuasive gaming strategies.

Keywords

cancer games; persuasion; persuasive games; persuasive technology; serious games; theoretical model

Issue

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1. Introduction

The persuasive potential of digital games has been proven to be useful to change, reinforce or shape the attitude and/or behavior of players in several fields such as advertising (Deal, 2005; Wise, Bolls, Kim, Venkataram, & Meyer, 2008), pro-social communication (Ruggiero, 2013) and healthcare (Orji, Mandryk, Vassileva, & Gerling, 2013). However, if we pay attention to the different academic definitions used for the concept of persuasive games, and the different categories of persuasive goals studied within this field, it can be concluded that researchers mean different things when they refer to the persuasive potential of digital games.

Persuasive games have been defined as “games that mount procedural rhetoric effectively” (Bogost, 2007b, p. 46), “games explicitly created to change attitudes and behavior” (Ruggiero, 2013, p.213), “digital games that aim to shape, reinforce or change the perceptions, emotions, beliefs, behavioral intentions and behaviors

of players” (De la Hera Conde-Pumpido, 2014, p. 75), “games that aim to increase players’ awareness of critical and timely social issues” (Kaufman, Flanagan, & Seidman, 2015, p.174), or “designed interventions with the primary purpose of changing a user’s behavior or attitude in an intended way” (Orji et al., 2013). It follows that, while some researchers relate persuasion through digital games to their capacity to convey persuasive messages (Bogost, 2007a), others focus on the games’ capacity to trigger specific behaviors (Orji et al., 2013) or facilitating specific interactions among players (Kulyk, Den Daas, David, & Van Gemert-Pijnen, 2015).

These differences in the way persuasion through digital games is defined and studied are the result of the complex nature of this practice. This complexity is not only due to the wide range of possible applications but the complexity of the process of persuasion itself, and how the specificities of digital games have an influence on this process. For this reason, it is necessary to provide theoretical frameworks that can serve not only to ana-

lyze the use of different persuasive strategies in relation to different persuasive goals, but that also can be useful tools to select a specific persuasive approach when designing persuasive games. The provision of new theoretical concepts and frameworks is of special relevance in the relatively new field of persuasive games, as these become relevant tools for scholars in the field that can serve to better structure their work and communicate about their insights. This is, therefore, the main goal of this article.

Here, I use an overarching definition of the term persuasive games that serves as an umbrella to all the definitions previously discussed, and that allows me to study this practice from a broad perspective. A persuasive game is understood in this article as a “digital game in which the primary intention of its development is to shape, change or reinforce attitudes toward a concept or object that is separate from the game to match an attitude goal state” (Jacobs, 2017, p. 15). Jacobs suggests this definition in the line of current persuasion research that assumes that behavioral change is always a result or consequence of attitudinal change (O’Keefe, 2002).

To propose the theoretical framework presented in this article, I use as a starting point the conceptual framework of behavioral scientist B. J. Fogg (2003), who described the overlap between persuasion and interactive technology, to argue that it is possible to identify three different roles of digital games when used with persuasive intentions. According to Fogg’s conceptual framework, digital games can be used: (1) as media for persuasion providing compelling meaningful experiences that convey specific messages, (2) as tools for persuasion to persuade players in a number of ways such as making a target behavior easier to perform, and (3) as social actors for persuasion “by applying the same persuasion principles that humans use to influence others” (2003, p. 89). In sections 3–5, I explain in detail how digital games can play these three different roles to influence the attitude of players in different ways. I also explain how the specificities of digital games can be linked to specific persuasive roles, which is something Fogg’s framework—based on the role computer technology plays for users—does not address.

In order to illustrate my arguments, I will analyze how the three roles of digital games have been used in the field of healthcare, and specifically for the design of cancer games. In this article, I will use five cancer games as examples of how this topic can be addressed from different approaches when different persuasive roles of digital games are used to support cancer patients.

2. Digital Games to Support Cancer Patients

The positive effects of the use of digital games in the field of healthcare is a reality demonstrated by numerous research studies worldwide (Kato, 2010). Digital games are being used with excellent results to, among other things, overcome phobias (Miloff et al., 2016), support rehabili-

tation therapies (Reid, 2002) and carry out neuropsychology therapies (Hardy, Bonner, & Willard, 2010). Among all their applications in the field of healthcare, their use to support cancer patients (especially children and adolescents) stands out.

According to the World Health Organization, cancer is one of the leading causes of mortality worldwide, with 14 million new patients in 2012—a figure that is expected to increase by about 70% over the next two decades. There is extensive knowledge about the causes of cancer, how it can be prevented, and how to manage the disease once it has been detected. Healthcare persuasion uses this knowledge to promote specific *sick-role behaviors*. *Sick-role behaviors* are those undertaken by cancer patients to succeed in their recovery or to improve their quality of life while under treatment (Baranowski et al., 2015). Healthcare persuasion to promote sick-role behaviors in cancer patients includes strategies to help patients adhere to their treatments (e.g. taking a full course of oral chemotherapy), and to manage their disease, e.g., controlling anxiety, reducing stress, eating a balanced diet (Orji et al., 2013).

Previous research has shown that digital games are an effective vehicle for cancer-related healthcare persuasive strategies (Kato, 2010). Cancer treatments, especially chemo, are really aggressive, with many side effects that are not always easy to cope with. For this reason, and especially in the case of children, supporting treatment adherence becomes especially relevant. In this respect, there are three different challenges that patients face: (1) lack of information about the treatment or the disease itself, (2) lack of motivation to start or continue with the treatment, and (3) difficulties in coping with the treatment or the disease. In the following sections, I explain in more detail what these three different challenges mean for cancer patients, and I argue how digital games can play different roles in supporting cancer patients to face each of them. The analysis of the games discussed in the following sections is theoretical in nature and it is done to illustrate my arguments on the different roles digital games can play in the process of persuasion.

3. Digital Games as Media for Persuasion

The first challenge of cancer patients that I want to discuss in this article is the lack of information about the treatment, i.e., how it works and what effects it may have, or the disease itself. There are numerous studies that show that many cancer patients have a misperception about the disease or the effects of the treatment before starting with it (Wakefield, Butow, Fleming, Daniel, & Cohn, 2012), often fearing worse side effects than they actually experience. For this reason, providing complete and accurate information about the reality is essential for patients to face the disease and to adhere to their treatment (Mitchell, Clarke, & Sloper, 2006). Overcoming this challenge is more complicated when we talk about children or adolescents than in the case of

adults (Mitchell et al., 2006). A conversation with a doctor or caregiver to talk about the disease, the treatment and its consequences is usually not easy and understandable enough. That is why looking for creative ways to offer treatment information that is understandable to children/adolescents and does not make them afraid is of particular relevance to healthcare specialists. Digital games have proved to be an interesting media to transmit the desired information to children in a way that is well received by them (Kurt & Savaser, 2011).

In their role as *media for persuasion*, digital games are used to convey a persuasive message focused on changing the attitude of players by means of persuasive communication. According to the communication scholar Gerald R. Miller, any message that is aimed to shape, reinforce or change the attitudes or behaviors of receivers is to be considered as persuasive communication (2012, p. 7). Therefore, when used as media for persuasion, digital games convey persuasive messages that intentionally aim to influence attitudes. When used as media for persuasion, digital games can promote treatment adherence by conveying messages focused on helping patients to better understand what are they going through and how the therapies and lifestyles they are being asked to stick to can help them to overcome the disease. As previously stated, complete and accurate information supports patients to have a more positive attitude toward treatment adherence (Mitchell et al., 2006). According to Fogg's (2003) theoretical framework, digital games can be used as media for persuasion by: (1) allowing people to explore cause-effect relationships, (2) providing people with vicarious experiences that motivate, or (3) helping people rehearse a behavior.

An example of how digital games have already been used for this purpose is the *Re-Mission Game* (Hope-Lab, 2006)—see Figure 1—designed to increase knowledge about chemotherapy, change patients' perceptions of their ability to influence health outcomes, and to provide patients with confidence in their ability to meet the specific demands of cancer treatment and recovery. In the game, children control a character that navigates through the interior of the human body. Through the character, they can destroy cancer cells and defeat the main tumor. Thanks to a friendly design and simple game mechanics, children can understand a complex process.

This game acts as a medium for persuasion by allowing children to *explore the cause-effect relationships* of chemotherapy treatments. The mechanics of the game, and the challenges they need to complete, allow children to explore the effects of chemotherapy on their bodies through their actions in the game. By better understanding how this process works, they can be more open to undergoing their treatment, regardless of the side effects the treatment has on their bodies.

Besides this, being in control of the main character, which allows the children to navigate through their bodies and kill cancer cells to defeat the disease, puts them in control of the situation, and helps them experience the satisfaction of having done something to overcome the disease. This experience can be later translated into their reality: if they undergo the treatment, they are contributing to beating cancer and accordingly playing an important role in this process. The narrative of the game (the role of the main character, which is his/her mission, and the human body as the game space) is therefore also relevant, as it involves the players in a vicarious experi-

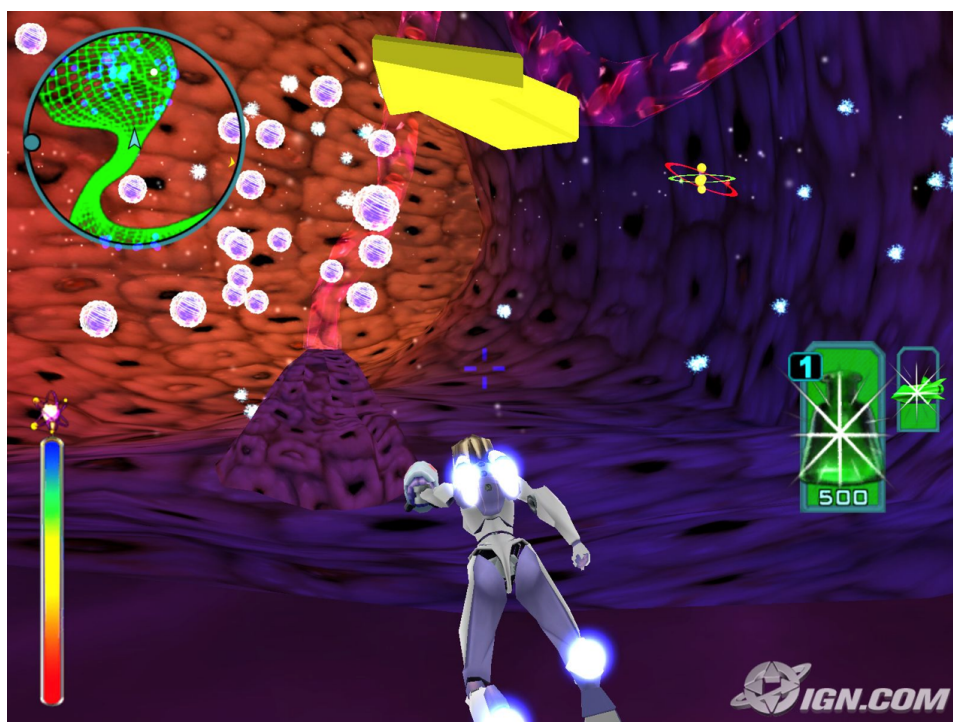


Figure 1. Screenshot of *Re-Mission*.

ence that motivates. Research on Re-Mission has indeed shown that it is effective in increasing adherence to treatment among its players (Kurt & Savaser, 2011).

A second example of how digital games can be used as media for persuasion to overcome cancer patients' lack of information is the *Veevia Cancer Game* (Wei, 2007), an online game designed to help these patients understand the relevance of following a healthy lifestyle by establishing a relation between healthy living and the efficiency of cancer treatment. The game, designed by the multimedia artist Wei Wei, helps players to comprehend how pathogenic factors can affect organ functions and interfere with treatment efficiency. The player can learn and understand more about the relevance of following a healthy lifestyle by exploring the inner relations between healthy habits and the efficiency of the cancer treatment within the game.

In this game, again, game mechanics are used to help players to *explore cause-effect relationships*, and the narrative involves them in a *vicarious experience* designed to motivate them. In *Veevia*, the player has to explore the human body, with the possibility of different organs that are subject to cancer. Each organ is a new level in the game in which the player needs to face a concrete challenge and can learn about the cause-effect relationship between a specific noxious habit and the way it interferes with the treatment. In the second level, for example, the player enters the liver (Figure 2). The objective of this level is to make the player understand that drinking alcohol reduces the efficacy of cancer treatment. When the player enters the level, he/she finds a big cancer tumor that blocks his/her way to the door taking him/her to the next level. Quickly, the player understands that he/she needs to kill the tumor to be able to go to the next level. However, if the player tries to use a bunch of medicines (representing chemotherapy treat-

ment) placed next to it, they do not seem to have an effect on the tumor. If the player pays attention, he/she discovers that it is possible to choose the drinks that are entering the liver. When the alcoholic drinks are removed, the medicines can be used to kill the tumor. Then the player can easily reach the door that takes him/her to the next level. By completing this level, the player can better understand the relationship between a bad health habit (drinking alcohol) and cancer therapy results. Other levels in the game follow a similar logic. By facing these challenges the player can better comprehend the relationship between a healthy lifestyle and the efficiency of cancer treatments. By *rehearsing healthy habits* and avoiding noxious ones in the various levels, the player has time to reflect on the relevance of specific choices and the impact they can have on his/her health.

The two examples discussed in this section illustrate how digital games can be used as *media for persuasion* to help cancer patients overcome the challenge of lack of information about the disease or the treatment. The brief analysis of these two examples also shows that game mechanics and the narrative are relevant game elements that can be used for the purpose of conveying persuasive messages.

4. Digital Games as Tools for Persuasion

A second challenge that cancer patients have to face that I want to discuss in this article is related to the lack of motivation to start or continue a treatment. As I mentioned earlier, cancer treatments or their side effects are often aggressive or difficult to cope with. The diagnosis and treatment of cancer is a stressful and threatening experience for patients and especially for children (Hicks & Lavender, 2001). Although survival rates for cancer are higher than ever before, the course of treatment for can-

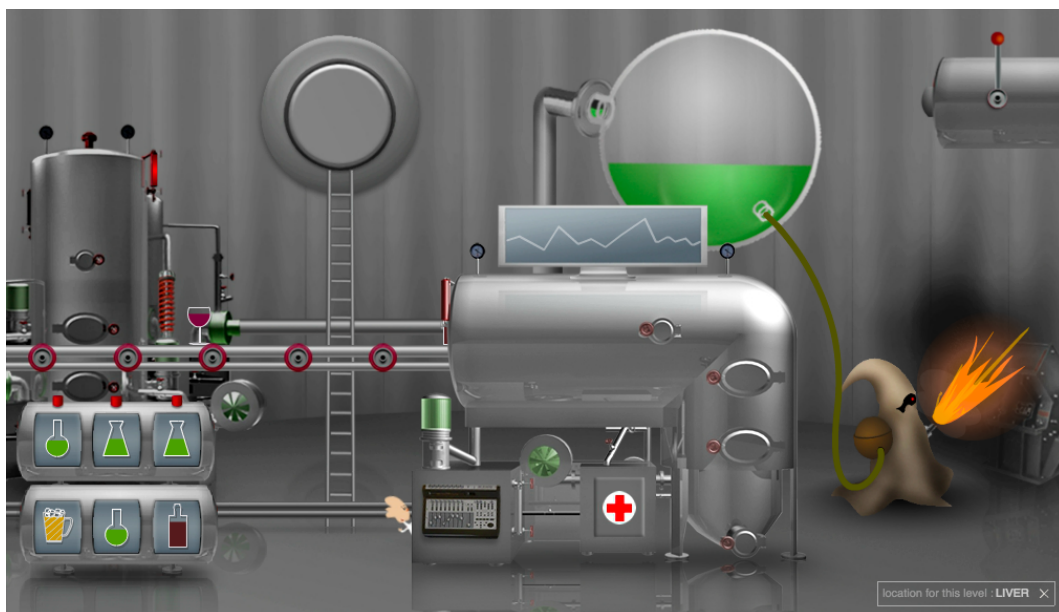


Figure 2. Screenshot of *Veevia Cancer Game*.

cer, such as chemotherapy, surgery or radiotherapy, is still a very stressful experience. Cancer patients may not only be at risk from adverse medical effects, but their psychosocial well-being may also be severely affected as a result of cancer and its therapy (Langeveld, Grootenhuis, Voûte, & de Haan, 2004). For this reason, even if patients have enough information on how a treatment works and its benefits, they may not have sufficient motivation to start or continue with it at a given time. In this section, I want to argue that digital games can help in this regard, serving as a *tool* to motivate patients to comply with treatment guidelines.

During the past decade, there has been an increase in the use of therapeutic play intervention to help cancer patients cope with the stress of hospitalization and treatment (Li, Chung, & Ho, 2011). Therapeutic play is a set of structured activities designed according to the psychosocial and cognitive development of cancer patients, as well as health-related issues, to help them cope with psychological and emotional difficulties (LeVieux-Anglin & Sawyer, 1993). The central goal of therapeutic play is to facilitate the emotional and physical well-being of patients (Vessey & Mahon, 1990). In their role as *tools for persuasion*, digital games are designed to influence and motivate people in specific ways by making activities easier or more efficient to do (Fogg, 2003). The games are therefore not used as a medium to convey a persuasive message, but as mediating tools that transform the way patients have to do certain activities in something more attractive to them. Patients are often required to undergo procedures or engage in behaviors that are either painful and aversive (e.g., undergoing chemotherapy), or boring and mundane (e.g., taking pills, exercising on a regular basis). These procedures and behaviors are often necessary to maintain and improve health or even to cure the patient's disease (Kato, 2010, p. 113). When used as tools for persuasion, digital games persuade players to change their attitude toward their treatment by

transforming the treatment into something different and more appealing to them.

According to Fogg's theoretical framework (2003), in their role as tools for persuasion, digital games can be used to support cancer patients in undergoing painful or boring procedures by: (1) reducing a complex activity to a few simple steps, (2) leading users through a predetermined sequence of actions or events, step by step, (3) suggesting a behavior at the most opportune moment, (4) helping people to monitor themselves to modify their attitudes or behaviors to achieve a predetermined goal or outcome, or (5) allowing doctors to monitor the behavior of patients.

An example of this is the game *Cogmed Memory Training* (Pearson, n.d.)—see Figure 3—developed to aid the treatment adherence of patients who experience cognitive problems, which is one of the side effects of treatments such as brain chemotherapy. Neuropsychological rehabilitation treatments require the patient to repeat a series of simple tasks, such as associating objects of the same color and shape, in a continuous and intense way. The treatment can be really exhausting for patients, and it can become boring for children. For this reason, neuropsychologists are using games that help to work the same skills in a more entertaining way for patients. The game *Cogmed Memory Training* has been shown to be an effective tool in this regard, to support treatment adherence (Cox et al., 2015).

Going back to Fogg's theoretical framework, the game helps to *lead patients through the different steps* of the treatment through a series of mini-games, focused on training different skills in patients that are necessary for their recovery. The game keeps patients busy and focused on different challenges and levels, which help them to persist in the treatment. Besides this, the game *helps patients and doctors to monitor their progress*, which helps patients increase their perception of being in control of their own health, and also helps doctors



Figure 3. Screenshot of *Cogmed Memory Training*.

to adapt the treatment considering patients' progress. What makes this game an efficient tool to influence players' attitude toward the treatment is what I call *tactical persuasion* (De la Hera Conde-Pumpido, 2014), which is using the rules of the game and the game mechanics to engage players in the game session, and to motivate them to start playing the game and to keep playing it. Besides this, the feedback provided to the player and the doctor on the progress of the patient is also of special relevance and key to motivating the player to continue with the treatment.

The example discussed in this section show how digital games, in their role as tools for persuasion, can motivate cancer patients to start or continue with a treatment that might be difficult to cope with. In this case, the rules of the game are crucial to motivate and engage players in specific behaviors, and the feedback provided throughout the game also becomes of special relevance.

5. Digital Games as Social Actors for Persuasion

A third challenge that cancer patients face that I want to discuss in this article is the problems in coping with the disease or the treatment and its side effects. Some patients have all the information about the treatment, and have the motivation to carry it out, but have difficulties coping. Examples of these difficulties include anxiety or fear of how the disease will develop, discomfort generated by the treatment received, and hair loss in the case of patients treated with chemotherapy. In this respect, the support of other patients who are going through or have experienced the same difficulties can be of particular help. However, it is not always easy to establish new relationships with other patients, or initiate conversations on issues that concern you with people with whom you do not have a close relationship. To support patients to face this challenge, digital games can take the role of social actors for persuasion and be used to mediate the process of seeking social support. The persuasive potential of this role relies on the capacity of digital games to be used to persuade players, "by giving a variety of social cues that elicit social responses" from them (Fogg, 2003, p. 89).

When used as social actors for persuasion, digital games may utilize either computer-human persuasion or computer-mediated persuasion (Oinas-Kukkonen & Harjuma, 2008). On the one hand, when used as a form of computer-human persuasion, digital games may utilize some patterns of interaction similar to social communication (Fogg & Nass, 1997). This is the form of persuasion through computers that is addressed by Fogg (2003) when he discusses the role of technologies as social actors for persuasion. In this article, however, I also want to discuss the possibility of digital games to use computer-mediated persuasion in their role as social actors for persuasion. Computer-mediated persuasion means that people are persuading others through computers, e.g. discussion forums, e-mail, instant messages, blogs, or social network systems (Oinas-Kukkonen & Har-

juma, 2008). Recent research, for example, shows that dialogue support features play a significant role in relation to adherence to web-based health interventions, especially for young adults, who tend to be influenced by their peers (Kulyk et al., 2015).

An example of how digital games can use computer-human persuasion to support cancer patients is *Aflac Duck* (see Figure 4). *Aflac Duck* is a robot duck designed to help and entertain children going through chemotherapy to cope with cancer. The duck comes accompanied by a tablet game children can use to interact and play with him. Using the table game and a built-in little chemotherapy port, children can put their duck companion through rounds of chemo, making real treatment a little less scary. As part of the game, children should also feed Aflac, bathe him or dance with him, among other things. This helps reverse the roles of the children from suffering patients to helping caregivers, thus giving them control of their experience, which helps to change their attitude toward treatment.



Figure 4. *Aflac Duck*.

Through the emotional and interactive responses, Aflac is perceived as a social actor that according to Fogg (2003) is able to leverage the principles of social influence that serve to motivate and persuade. Through the embodied character, different types of social cues can result in social influence. Physical cues such as Aflac's body movements and facial expressions are clearly used in the game to communicate with players. The main goal is to help children feel they are not alone in the process. The duck comes with several emoji counters with feelings children experience most while undergoing treatment—happy, silly, scared, nauseous, angry, calm, and sad—which kids can tape to the duck's chest and watch it act out, helping them express and share their feelings. Through these cues, Aflac conveys the pain and difficulties he is going through at certain moments (for example, when chemotherapy is administered), but moreover he helps children to reflect on the relevance of hope and persistence. Psychological cues are also relevant in the game; how feelings and emotions are communicated through the character, by the use of physical expression or language, become relevant.

As stated before, besides using computer-human persuasion, digital games can also use computer-mediated persuasion in their role as social actors for persuasion. This means that the game becomes a mediating tool between different players, facilitating some players to persuade other players. An example of how digital games can play the role of social actors for persuasion by using computer-mediated persuasion is the platform *Adventures in Sophoria* developed at the University of Duisburg-Essen with the goal of facilitating the intercommunication of teenagers during cancer treatment. The game becomes the point of union between players, who begin to talk about their game and the characters of their game, and on many occasions that first contact evolves until a real friendship is established between two people who are going through similar difficulties, thus delivering a support for coping. This is related to the capacity of digital games to foster social interaction (De la Hera Conde-Pumpido & Paz Aléncar, 2015), and the tools implemented in the game itself to facilitate this interaction, such as the chat box that allows players to chat while playing or the options to share links and private messages with their friends. Besides this, the context in which these games are played—a Massively Multiplayer Online Role Playing Game (MMORPG) especially aimed at young cancer patients—becomes relevant in this process, as users might find it a natural context to look for contact with other people going through similar experiences, which can help them to feel more comfortable about disclosing their personal experiences, sharing emotions and feelings, and looking for support. We can then talk about game-mediated type of persuasion, meaning that the game becomes persuasive when being played in a specific context with a specific purpose (De la Hera Conde-Pumpido, 2017).

The two examples discussed in this section serve to illustrate two different ways in which digital games can play the role of social actors for persuasion to support cancer patients. This shows the differences between computer-human persuasion and computer-mediated persuasion. In the first case, we can see how embodied characters in games, how they are represented, how they interact with other characters with a specific context, and how players can influence their performance in the game through interactions, play important roles in the process of human-computer interaction. In the case of computer-mediated interaction, *social persuasion*, which is the capacity of digital games to foster social interactions (De la Hera Conde-Pumpido, 2014), becomes more relevant.

6. Conclusions

The five games analyzed in this article are just some examples of how digital games can help overcome the three challenges related to adherence to cancer treatments. Through these cases, I have illustrated how digital games can play three different roles in the process

of persuasion, becoming media, tools and social actors for persuasion. The discussion of these examples serves to illustrate how the theoretical framework presented in this article can help to better understand how the different roles that digital games can play in the process of persuasion can achieve different goals when games are used for persuasive purposes. This is useful to analyze how different persuasive strategies are being used to achieve different persuasive goals and how different game elements better respond to different persuasive intents. Besides, this framework can be an interesting tool for designers of persuasive games, so they can make informed decisions when choosing a persuasive strategy for their designs. I am currently working on a theoretical model that links the use of the different persuasive roles to specific aims of the game. This model will serve to further explain how these different roles can better respond to different persuasive challenges such as changing, shaping or reinforcing the attitude of players. Additionally, this model will link these two variables to a third one related to the level of involvement of players in the process of persuasion.

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Conflict of Interests

The author declares no conflict of interests.

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Article

Challenges with Measuring Learning through Digital Gameplay in K-12 Classrooms

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Abstract

Videogames have long been lauded for their potential to increase engagement and enhance learning when used in classrooms. At the same time, how to best evaluate learning presents challenges, especially when the game does not have standardized assessments built-into it and when games are taken up in a wide variety of ways in quite diverse contexts. This article details the use of a geography game to support learning in 32 diverse classrooms in Ontario, Canada, alongside challenges with evaluating student learning using a game that did not have a built-in assessment system. In total, 795 students participated in the study. Classroom observations and interviews with teachers were triangulated with student pre and post evaluations. Results demonstrated that students did learn from gameplay, as demonstrated through multiple choice and short answer change scores in the pre to post evaluation, despite variations in duration of play and how the game was integrated in the classroom more generally.

Keywords

assessment; digital games; game-based learning; games

Issue

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1. Introduction

Proponents of digital games have argued that they can be effective tools for supporting student learning in K-12 classroom spaces, creating playful and immersive environments that are more engaging than traditional methods of instruction (Gee, 2005; Prensky, 2006; Shaffer, Squire, Halverson, & Gee, 2005; Squire & Jenkins, 2003). The benefits of using games to support subject-specific learning have been well-documented (Kirriemuir & McFarlane, 2007; Mitchell & Savill-Smith, 2004). For geography learning in particular, digital games can support understanding of geographical space, as players move through 2D and 3D environments and experience them from various vantage points (da Silva, 2015). Representations of place and space can also be explored through digital envi-

ronments, that are more explicitly constructed than real world spaces and can allow for comparative analyses of digital worlds and physical locations outside of game spaces (Dittmer, 2010). And some digital games, such as *Where in the World is Carmen Sandiego*, *Treasures of Knowledge*, *Quest Atlantis* and *GeoNet* do, to varying degrees, support alignment with elements of the social studies curriculum—the area of the curriculum where in many places, including Ontario, geography is studied up to grade six (Brysch, Huynh, & Scholz, 2012). Yet, as the incorporation of digital games into K-12 curricula is relatively new, more evidence on their use as a means of supporting students’ learning, specifically, is needed (Annetta, 2008; Linderoth, 2012; Young et al., 2012).

Research on using games in K-12 classrooms to support student geography learning is sparse. Virvou, Kat-

sionis and Manos (2005) conducted a multi-part study evaluating student learning with the digital geography game *VR-ENGAGE*, dividing students into groups according to their academic performance. Focusing on the number of questions students answered incorrectly, or their “mistakes” between pre and post test, they found that scores increased to a greater degree in students with typically lower academic performance. Their findings indicate that the use of digital games in classroom contexts may be particularly beneficial for lower performing, and less engaged students.

Other research has studied games that cover multiple subject areas including geography, rather than targeting geographic learning exclusively. Cheung et al. (2008) conducted a small exploratory study with high school students playing *Farmtasia*—a simulation game about complex farming systems. Analysis of pre and post test scores indicated that students scored higher on the post test, demonstrating that students learned through gameplay. Buch and Egenfeldt-Nielsen (2007) examined the game *Global Conflicts: Palestine* with high school students during a four-day game course. Their exploration focused mainly on student perceptions of the game, with the “learning experience” evaluated by asking students if they learned more, as much, less than or nothing in comparison with learning through “normal” (i.e., not game-focused) courses. They found that higher numbers of students reported that they learned more through the game course than those who learned as much or less than the normal course or learned nothing at all. Dourda, Bratitsis, Griva and Papadopoulou (2014) used *Whodunit*, a detective game centered on global landmarks, as a means of developing English language and geography vocabulary with English as a foreign language students. Student learning was evaluated using pre and post “knowledge tests”, that consisted of true and false and multiple choice fact-based questions (e.g., “which river runs through the Grand Canyon”; p. 250). Findings demonstrated that student scores increased from pre to post test, showing that students were enhancing their vocabulary, alongside their geographic understanding, through gameplay. Finally, Tüzün, Yılmaz-Soylu, Karakuş, İnal and Kizilkaya (2009) assessed the learning of 13 elementary school students using *Quest Atlantis*. Results from pre and post tests demonstrated learning, as students’ scores increased.

How to appropriately and adequately assess learning through games in educational contexts has also been the subject of much debate. First, the overreliance on standardized, pencil and paper, pre and post assessments as the sole means of evaluating learning has been called into question (Jenson, de Castell, Thumlert, & Muehrer, 2016; Rowan & Beavis, 2017). These modes of assessment fail to capture the multimodal competencies developed through digital gaming and that are not so neatly captured through propositions represented in multiple choice and true and false claims:

A fundamental problem in our assessment of games is that defining “educational effectiveness” is incredibly difficult. Measuring the learning outcome of a given activity is never easy, but the interactive nature of video games makes such quantification even harder. We also need to acknowledge that different kinds of computer games focus on different forms of knowledge, which are not easy to measure. Some of these knowledge forms will go largely unnoticed if we rely on, for example, simple multiple choice tests. (Egenfeldt-Nielsen, Smith, & Tosca, 2016, p. 257)

Second, game-based learning is often assessed using in-game data logs that track students’ behaviours as they move through game environments, producing a set of gameplay data. Data collected might include performance metrics such as the content accessed, time to complete tasks, and the number of “mistakes” and corrections made (Loh, Sheng, & Ifenthaler, 2015). Yet, when digital games are used in classroom contexts, analyses of student learning that focus exclusively on built-in assessment systems can position games as though they operate in isolation from a larger learning context that includes if, how and in what ways the classroom teachers supports student learning through digital gameplay (Hébert & Jenson, 2017) and how specifically the game is taken up in the classroom. Relying on in-game data to assess student learning can also exclude from use a wide range of commercial games from formal educational environments, “overlook[ing] the wider set of outcomes that a more diverse range of games and game-based work in schools might strive to achieve, and reflect[ing] a limited conception of the relationships between games, learning and curriculum” (Rowan & Beavis, 2017, p. 171). The absence of built-in assessments does require a re-imagining of the role of the game-based learning environment, to the extent that as Young et al. (2012) have argued “current methodologies must extend beyond their current parameters to account for the individualized nature of gameplay, acknowledging the impossibility of the same game being played exactly the same way twice and establishing that gameplay may need to be investigated as situated learning” (p. 62). But variations in how the game is used in the classroom, including the selection of activities and assessments to support learning, does create challenges for researchers in evaluating learning in these varied contexts.

To respond to a rather pressing need to produce empirical research on using digital games to support learning in K-12 classrooms, alongside the need to re-imagine assessment tools for documenting student learning that take into account the role of pedagogy and the learning environment more broadly, this article explores what students learned through playing a physical and human geography game—*Sprite’s Quest*—and how that learning was assessed through measures that attempted to account for differences in learning environments. *Sprite’s Quest* is platformer game, designed to teach grade 7 and

8 students about physical and human geography concepts. Next, we discuss the game in more detail, the participants in the study, how we attempted to measure learning through student questionnaires, and conclude with a discussion of what students learned.

2. Setting Up Learning through *Sprite's Quest*

2.1. The Game

The games used for this study were *Sprite's Quest: The Lost Feathers* and *Sprite's Quest Seedling Saga*, two 2D platform game designed by Centre franco-ontarien de ressources pédagogiques for Ontario's Ministry of Education. The games were selected by the funding partner, the Council for Ontario Directors of Education, who was interested in better understanding how the games might be used to support student learning in the classroom. The games can be downloaded on tablets through the Apple App Store¹ and Google Play Store.² They can also be accessed online, though only by request through a school board's technology consultant, who uploads the game onto the board-based site. The games are each accompanied by a student activity guide and a teacher guide, available only through the online version of the game.

In *Sprite's Quest*, the game's protagonist, Sprite, is a water droplet who journeys through six physical regions—The Himalayas, Japan, Indonesia, The Nile, Iceland and Costa Rica in *The Lost Feathers* and Hawaii, Brazil, New York City, Egypt, Amsterdam, and China in *Seedling Saga*. *The Lost Feathers* aligns with the grade 7 Ontario geography curriculum and *Seedling Saga*, with the grade 8 curriculum. Through game play, students encounter the physical and human geography concepts of place, liveability and sustainability, while learning, more specifically, about transportation, waste management, population growth, and tourism, as well as processes such as erosion and the water cycle.

Game content, as it connects to geography, appears in five forms. First, information is relayed to students through facts that appear in text bubbles—both as players enter levels of the game (see Figure 1) and during gameplay (see Figure 2). Second, players are given an initial multiple choice question, requiring map reading and the interpretation of charts and graphs, as they enter a new region of the game (see Figure 3). Third, the environment of and processes within a region are highlighted through the background and foreground of the game as Sprite jumps atop shipping containers, for example, that serve as evidence of transportation in the region, or avoids water droplets dripping from leaves, that provide evidence of the operations of the water cycle (see Figure 4). Fourth, the water cycle is demonstrated through Sprite's metamorphoses of form, that varies de-



Figure 1. Fact bubbles that appear as players enter a level.³



Figure 2. Fact bubbles that appear during gameplay.



Figure 3. Questions to complete for entry into region.

pending on the elevation and temperature of the region; the water droplet becomes a vapor cloud at high altitudes or a piece of ice in colder climates (see Figure 5).

¹ <https://itunes.apple.com/ca/app/sprites-quest-the-lost-feathers/id972933557?mt=8> (The Lost Feathers); <https://itunes.apple.com/ca/app/sprites-quest-seedling-saga/id973216081?mt=8> (Seedling Saga).

² <https://play.google.com/store/apps/details?id=com.cforp.ELOGR7&hl=en> (The Lost Feathers); <https://play.google.com/store/apps/details?id=com.cforp.ELOGR8&hl=en> (Seedling Saga).

³ © Centre franco-ontarien de ressources pédagogiques, 2016. Reproduced with the permission of the CFORP.

And fifth, the game contains a water vault that, when visited, can inform players about how much water is required in the production of various objects, such as a cup of milk, coffee, or tea (see Figure 6).



Figure 4. Players learn about geography through the background and foreground of the game.

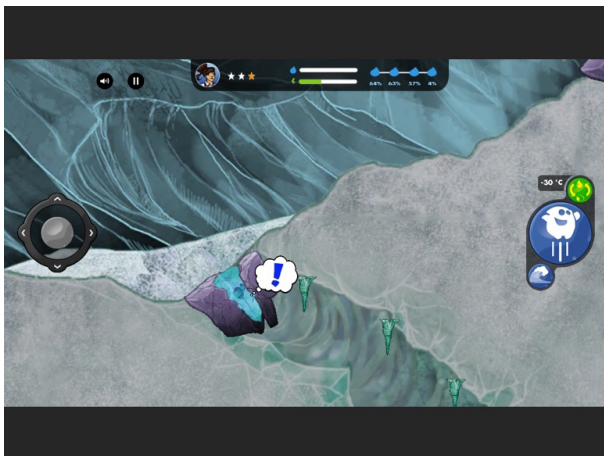


Figure 5. Sprite changes form from a water droplet to a piece of ice.

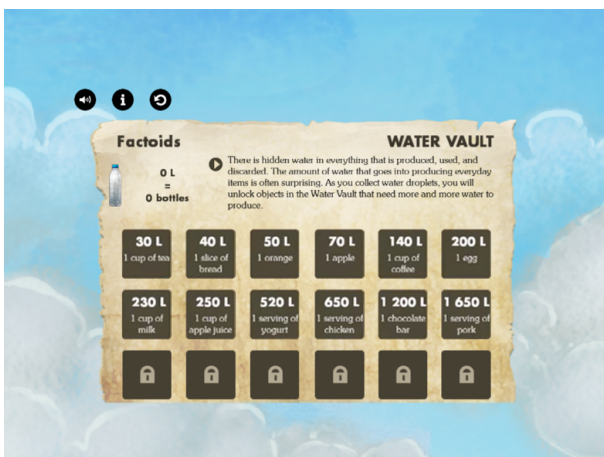


Figure 6. Water vault.

2.2. Open-Ended Learning in *Sprite's Quest*

It is important to note that the game did not contain a tracking system. Assessments of student learning were not built into the game and the game mechanics, in the sense that a player might respond to a question that pops up during or after play and be evaluated on this response within the electronic game-based learning system. While students complete multiple choice questions for one aspect of the game content—to gain entry into a level—no data is collected within the game about the whether or not questions are answered correctly. Other assessment metrics, such as level completion time or number of items collected in the water vault, are also not gathered through gameplay. To support student learning using *Sprite's Quest*, then, the teacher is required to either design assessments that can be used alongside the game and/or use the student guide.

The student guide (see Figure 7), targeted at each game, includes three During Game Play activities, one set of discussion questions per level, and a culminating activity for each region. All are rather open-ended. For the gameplay activities, the first, What's Where/There, Why There, Why Care, requires the identification of objects (e.g., animals, landforms, signs) in levels and an accompanying explanation of their significance to the region (see Figure 8). For the second activity in *The Lost Feathers*, labeled Natural Processes, students are provided a set of diagrams which are to be interpreted for the geographic processes they explain (see Figure 9). In *Seedling Saga*, the Human Systems activity asks students to identify elements of liveability within a region (see Figure 10). And in the third activity, Through the Eyes of the Artists, students compare an image in the game to a similar image online and compose a written critical response about similarities and differences (see Figure 11). Discussion questions, the least open-ended of the assessment tools, vary by level, but focus on a critical analysis of issues concerning a specific region. For example, for level one of Egypt, students are asked about the benefits of living along a river bank, what type of decisions would need to be made around infrastructure to build a city along a river, and about preserving historic sites such as pyramids. Finally, culminating activities consist of larger tasks such as writing a persuasive paragraph about a spe-



Figure 7. Main page of digital student guide.

cific environmental issue considering multiple perspectives, or critically analyzing maps and graphs as they relate to a particular area.

In addition to including open-ended activities, the game leaves much to teacher interpretation, including how activities might be evaluated and how the game might be used in the classroom. While the teacher guide does contain learning goals, success criteria, and expectations that might be distributed to students along with possible student responses, nothing is included that might standardize correct responses, such as rubrics. Suggestions on how to incorporate the game into the curriculum are outlined, in the teacher guide, as follows:

Teachers are encouraged to use their professional judgement on how best to incorporate the game and supporting resources into their program. How it is used depends on the available classroom time and access to technology. An extensive use of the game might require three 40-minute periods per location—

two to play the levels and do the During Game Play activities. In addition, the culminating activity will take at least one additional period. This, however, can be streamlined according to your available classroom time. For example, you can have your students play through all four levels for a location in a single period, and then complete one selected culminating task for that location's set of levels. You may also wish to look for opportunities for cross-curricular integration, such as incorporating the perspectives activity into your language program or the climate graphs into your data management mathematics strand. (Centre franco-ontarien de ressources pédagogiques, 2016, p. 2)



Figure 8. What's where/there? Why there? Why care? activity.

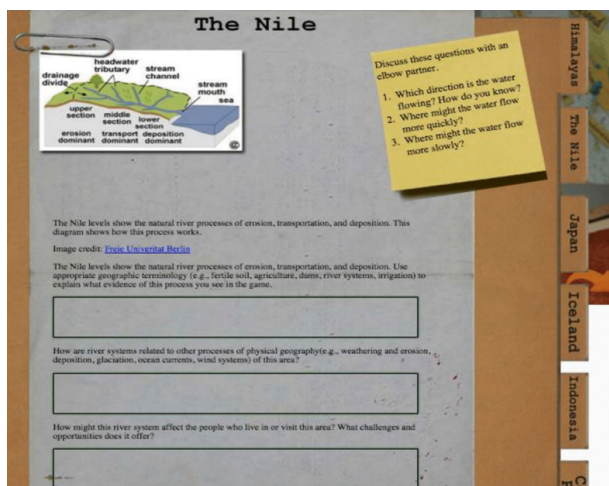


Figure 9. Natural processes activity.

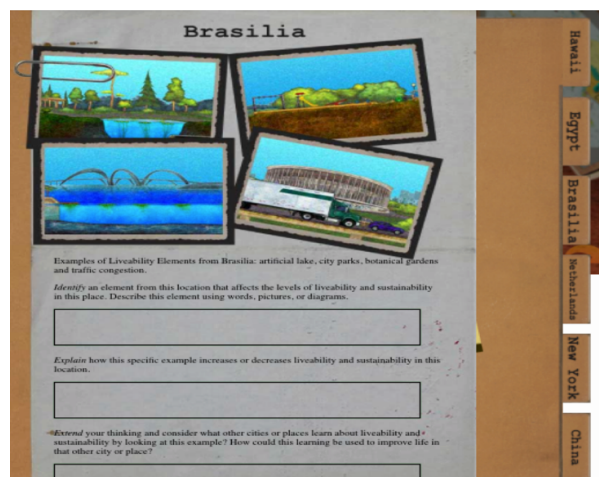


Figure 10. Human systems activity.



Figure 11. Through the eyes of the artist activity.

3. Studying the Use of *Sprite's Quest* in the Classroom

The purpose of this study was twofold. First, we wanted to examine the impact of a professional development session on fostering the creation of a classroom environment conducive to game-based learning. While professional development is not the focus of this particular

article, and the results of this aspect of the research have been discussed elsewhere (Hébert & Jenson, 2017), this aim is important to note as it relates to the framing of the study.⁴ Relatedly, we wanted to evaluate, empirically, student learning through the use of this particular game in the classroom. The open-ended nature of the game, and teachers' autonomy with regard to how the game would be played is significant as it pertains to how we, as researchers, could evaluate learning. The research question that framed this segment of the study was: what did students learn about physical and human geography through the *Sprite's Quest* unit?

3.1. Participants

Participants consisted of grade 6, 7, 8, and 9 students,⁵ across 9 school boards and in 24 different schools—13 suburban, 6 urban and 5 rural. 795 students and their 32 teachers participated in the study. Classes were quite varied in grade make-up, with 22 single grade classes (14 grade 7, 7 grade 8, and 1 grade 9) and 10 split classes (1 grade 6/7/9, 1 grade 6/7 and 8 grade 7/8).

3.2. Professional Development and Planning the *Sprite's Quest* Unit

Teachers were invited to attend a two-day workshop⁶ on how to create a classroom environment conducive to game-based learning, specifically, around *Sprite's Quest*. At the workshop, teachers were given time to play the game and become familiar with the teacher and student activity guides. As noted, slightly less than half of the teachers who participated in the study had students in their class from multiple grades, and so, could choose to use either one or both of (the) game(s) for the entire class, to divide the class by grade and use *The Lost Feathers* with grade 6/7 students and *Seedling Saga* with grade 8 students, or to introduce both games to the class and allow individual students the chance to decide which game to play. For planning, teachers were placed in small groups to create a unit around *Sprite's Quest* and to brainstorm possible assessments, provided with the flexibility to build off of the activities provided in the student activity guides and/or to design their own activities and assessments. This flexibility was important for: 1) maintaining teacher autonomy over the content of their curriculum and for using the game in a manner that would best support student learning; and 2) opening up possibilities to use the game to support cross-curricular learning, such as in support of the language arts or mathematics curriculum, in addition to geography. At the end of the workshop, teachers presented unit plans and assessment ideas to the group. Teachers were also asked to create the individual unit plans they would use in their class-

room and submit them electronically to the researchers prior to the start of the gameplay unit.

3.3. Data Collection

This study took a quantitative approach to data collection. Data consisted of pre (see Appendix A) and post (see Appendix B), pencil and paper questionnaires. The pre questionnaire was administered to students prior to the first lesson and a post questionnaire given the end of the unit. Given that researchers were not present for the duration of the game-based unit, questionnaires were administered by classroom teachers. Researchers picked up the pre questionnaires during site visits to individual classrooms, while post questionnaires were returned by the teachers in a pre-paid express envelope. Due to the different means of questionnaire collection (e.g., post questionnaires had to be mailed) and general, expected attrition, fewer post questionnaires were returned than pre questionnaires; 795 pre questionnaires were received compared to 540 post questionnaires. Questionnaires focused on student media use and learning through the game. The questionnaires will be discussed in more detail below as they created some challenges with respect to evaluating student learning with the game.

4. *Sprite's Quest* in The Classroom: Activities and Assessments

Given the open-endedness of the *Sprite's Quest* learning environment, the autonomy granted to teachers around how the game was taken up in their classroom, and the various needs of classes, including split grade classes, the game and its unit varied greatly. For example, the length of time spent on the game differed by teacher and ranged from three periods (of approximately 45 minutes) on the lower end of the spectrum to sixteen for classes that used the game more comprehensively. The activities used to support learning also differed by class. Most teachers did incorporate one or more of the activities from the student guide into their unit, printing or using the activities online, or modifying and building off of them. Teachers also decided to assess learning through the game in a wide variety of ways. Many offered formative assessments during the unit, providing feedback on discussion questions or play accountability sheets, for example, and evaluated students summatively on one final assignment—completing one of the culminating activities in the activity guide, being the most common form of summative assessment. Others provided one grade for students based on all of the work submitted.

Overall, what specifically teachers did over the course of the *Sprite's Quest* unit was difficult to track.

⁴ The control group for the study contained teachers who did not receive professional development.

⁵ In Ontario, students in these grades would typically be 11 to 15 years of age.

⁶ As a goal of the study was to examine the impact of the professional development session on teachers' classroom practice, additional teachers were invited to participate in the study who were not provided with PD (see Hébert & Jenson, 2017, for discussion of the impact of PD on teaching). In total, 28 teachers received PD and six did not.

Given that researchers were not present for the duration of the unit, we relied upon teachers' blog posts, accounts of their activities and assessments during interviews, and submission of activities and assessments. However, teachers blogged less frequently than we had hoped, likely owing to time constraints of planning and implementing a new unit. Also, as is the nature of translating plans into practice and responding to the needs of students, many teachers deviated from the initial unit plan submitted. Together, this resulted in challenges with creating a thorough and detailed account of the *Sprite's Quest* unit as it unfolded in individual classroom spaces.

5. Results: Student Learning

5.1. Students' Device and Media Use

For videogames in particular, the majority of the students who participated in the study played videogames with 557 (70%) indicating that they have access to and regularly use a game console and 237 (30%) reporting that they did not have access to and regularly use one. Using a 5-point Likert scale, students were asked about their frequency of play, with 0 indicating that students "never" play games, 1 "1–2 times per month", 2 "1–3 times per week", 3 "5–6 times per week" and 4 "5–9 hours per week". With scores averaged, the most frequent play times were reported for mobile or tablet games (2.62 out of 4), with only slightly lower frequency reported for handheld device games (2.16 out of 4), console videogames (2 out of 4), massively multiplayer online games (1.57 out of 4) and computer videogames (1.57 out of 4).

5.2. Student Learning: Multiple Choice Questionnaire Questions

Student learning was assessed through multiple choice questions, focusing on physical geography terminology. Questionnaires contained four multiple choice questions about weathering, erosion, tectonic plates, and phases of the water cycle, to which all students were asked to respond. These questions were developed by researchers based on concepts that appeared throughout both *The Lost Feathers* and *Seedling Saga*. The same questions were included on both the pre and post questionnaires. To ensure that change scores were captured in analysis, data included questionnaires where students had completed both the pre and post test. For this reason, the sample size was smaller than the initial pre-questionnaire ($n = 540$). Multiple choice change scores were calculated by subtracting pre questionnaire multiple choice scores from post questionnaire multiple choice scores ($MC_{change} = PosttestMC - PretestMC$). Students had a mean score of 2.32 out of 4 ($SD = 1.16$) on the pre test and 2.56 ($SD = 1.18$) out of 4 on the post test. Multiple choice scores increased an average of 0.24 points ($SD = 1.17$) between the pre and post

test. A paired t-test indicated a statistically significant difference between pre test and post test multiple choice scores, $t(539) = -4.80, p < .001$. Previous experience playing videogames did not have any bearing on students' scores.

5.3. Student Learning: Short Answer: Quantitative Analysis

For the short answer section of the questionnaire, the questions were divided by game, and students asked to respond to two or three of five questions for *The Lost Feathers* and/or for *Seedling Saga*. On the pre questionnaire, questions were taken directly from the student activity guides and mainly focused on table, map and graph reading, with the exception of one general question about plate tectonics from the student activity guide and four general questions that asked students to define liveability, sustainability and place and identify the "types of things" geographers might look to "in order to understand liveability in a particular area". The post questionnaire differed slightly in structure. First, the post questionnaire was longer, and students were asked to respond to three or four of seven short answer questions. Second, in addition to table, map, graph reading and short answer questions taken directly from the student guide, researchers included a general question for each game that asked students to select a specific level of the game that they played, identify objects from that region and explain their significance. This question allowed for students to capture their learning more specifically by writing about a particular location that they played.

Given the open-endedness of the activities and assessments provided for the game and variety of ways that teachers could take up the game in class according to their curricular and grade-based needs, the questionnaire did not include directions as to what section of the short answer questions should complete. As a result, some classes completed the questionnaire in its entirety, regardless of game played, while others filled out the sections of the questionnaire that corresponded with playing either *The Lost Feathers* or *Seedling Saga* in class. Questions included in analysis corresponded with the game students played in class and the corresponding questions completed on the questionnaire. Additionally, while students were asked to complete two or three short answer questions in the pre questionnaire and three to four questions in the post questionnaire, some students completed more. In such cases, all questions were evaluated and the top two and top three scores were included for analysis from the pre and post questionnaires respectively, based on the game(s) the students played in class.

As the number of possible answers varied from pre to post test, individual scores were converted into percentages to obtain mean scores and to evaluate change scores. On the pre test, students had a mean score percentage of 39% ($SD = 1.63$) compared to a post test mean

percentage score of 44% ($SD = 2.42$), with a change score of 5.12% ($SD = 25.3$). A paired t-test indicated that the difference between students' pre test short answer scores and post test short answer scores were statistically significant, $t(539) = -4.71, p < .001$.

We were interested in determining whether the questions that offered students the opportunity to select an object from a location played, to identify it and explain the object's significance were related to both higher change scores and higher post test scores. In other words, we wanted to know if providing students more openness with respect to demonstrating their learning resulted in higher scores than more closed questions that narrowed the learning that could be expressed. In comparing scores, performance on the questions where students had to identify three objects/features within a particular geographic region was related to both change scores and total post test scores, where better performance on the geographic region object question predicted more improvements between the pre and post test ($r = 0.25, p < .001$) and higher scores on the overall post test ($r = .53, p < .001$). It should be noted that these results are not necessarily the most reliable measure. If students did well on one of these questions, it's likely that it was selected as one of their best 3 answers, and therefore contributed to their overall post test score. Thus, the shared variance here can lead to some misleading conclusions regarding the importance of performance on this question as it relates to overall performance.

6. Discussion

This study demonstrated that even under radically different conditions, with a diverse population of students and teachers, and variation in pedagogy, this particular digital game supported student learning. On both multiple choice and short answer questions, students overall demonstrated a significant improvement having played the game and completed the curriculum unit designed by their teachers around the game. That conditions varied widely between classes did not seem to effect the overall gains, nor did differences between students. Whether or not students had previously spent time playing games did not correlate with their overall scores, and we did not control for those students who were English Language Learners or had learning disabilities. This study, then, goes some way in demonstrating that learning can be supported through game-based play.

We did encounter a number of challenges with this study that raise questions about how to assess student learning using digital games, in K-12 classrooms, where learning is often messy and complex. First, prior, future, and cross-curricular learning are significant considerations in understanding how students make connections between the game and the curriculum. While, in our study, teachers designed a unit around the use of *Sprite's Quest* in the classroom, many connected the game to larger class discussions already underway—as part of the

geography curriculum—about pollution, waste management, designing communities, and travel and tourism. Teachers also highlighted learning in mathematics while reading charts and graphs, and in history, in reading images in the game and discussing authorship and context. If we are to conceptualize digital games as one form of media used to support student learning within an expansive, multi-disciplinary curriculum, how students make meaning drawing from a wide variety of curricular resources needs to be taken into account. This makes isolating learning through a particular medium, such as a digital game, rather challenging. To wholly capture how the digital game figures into student learning, researchers would likely need to be present for the duration of the school year, a feat not feasible in studies with a large number of participants.

While standardized assessment models are the norm in game-based studies, either administered to players in the form of tests pre and post play or through in-game, or stealth systems (All, Nunez Castellar, & Van Looy, 2014), they fail to adequately measure learning that can be expressed outside of the literal box and take into account immense differences between learning contexts. If game-based learning environments constitute not only the game but also the classroom in which the game is used, assessments of learning need to be open enough to account for these differences and to allow space for the messiness and uncertainty of both teaching and learning in digital environments. In these contexts, digital-games might not be conceptualized as stand-alone interventions but as part of a broader learning context, where games are used in conjunction with other media and where the role of the teacher is positioned as a pivotal element of the learning process.

7. Conclusion

While we were not able to report on the study in its entirety, this article examines the impact of a curriculum unit focused on a digital game in 32 diverse geography classrooms. Even given the complexities of negotiating research in so many classrooms and under such diverse conditions, this study shows a measurable gain in learning and understanding for students who participated. Indeed, what we think is worth highlighting here is that even as students might have played the game from anywhere between one hour to up to twelve hours, and that 32 teachers decided to approach the integration of the game in a different way (using worksheets, the student guide, the teacher's guide, and/or no use of guides), the data showed a measurable gain for the majority of the study's participants. Further, and related to previous literature on games and learning (All et al., 2014; Buch & Egenfeldt-Nielsen, 2007), we have reported on the messiness of trying to "measure" gains from gameplay when it is difficult to isolate that from the other learning opportunities that are available in a classroom environment.

Here, we have attempted to take up the challenge set by Young et al. (2012), who argued that we need to produce better research on game-based learning. At the conclusion of their article, they draw a metaphorical picture of what research is needed in this area, referencing Super Mario Brothers and its heroes Mario and Luigi, who embark on a quest to save the princess, writing: “let us prepare our blue overalls and plungers as we embark on the next journey through the warp pipe to find the right princess in the right castle...eventually producing the highest score: engaging and effective student learning” (pp. 84–85). While we did not fully achieve that aim, we certainly can say with some confidence that learning can be supported through digital gameplay, even in very different classroom environments. However, how best to measure that, and how to better document the messiness that accompanies school-based studies remains a significant challenge.

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Conflict of Interests

The authors declare no conflict of interests.

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Appendix A. Pre-Questionnaire Questions

A1. Physical Geography Terminology

40. What does “weathering” mean?

- a) a distinct layer of soil encountered in the vertical section
- b) work performed according to a binding contract between two parties
- c) a flowing mixture of water and debris that forms on the slopes of a volcano
- d) the breaking down of rocks, soil, and minerals through contact with the earth’s atmosphere
- e) I don’t know

41. What does “erosion” mean?

- a) rain that becomes more acidic than normal
- b) the process by which the surface of the earth is worn away
- c) when water is turned into gas
- d) a fracture of the earth’s crust
- e) I don’t know

42. What are “tectonic plates”?

- a) plates that glide over the Earth’s mantle
- b) a permanently frozen layer of rocks
- c) a line of bold cliffs
- d) an area of diminished precipitation on the downside of a mountain
- e) I don’t know

43. What are the phases of the “water cycle”?

- a) liquid, gas, land
- b) liquid, solid, gas
- c) liquid, solid, ether
- d) solid, gas, bubbles
- e) I don’t know

A2. Other Geography Short Answers: Sprite’s Quest: The Lost Feathers

Answer two or three questions in this section as best you can.

44. What do the arrows show on the diagram?

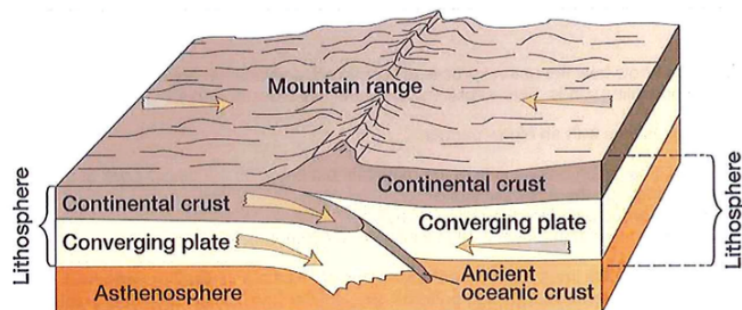


Image credit: 2005 Pearson Prentice Hall, Inc.

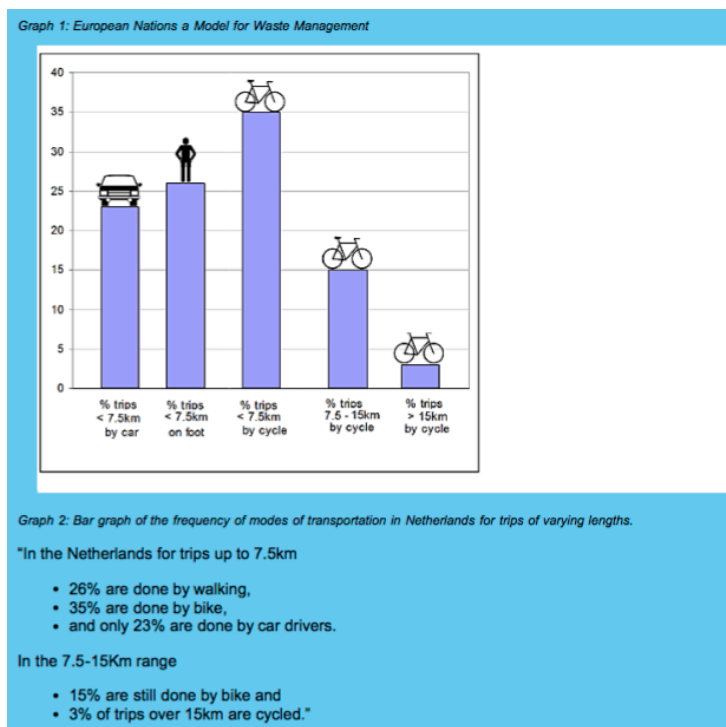
45. Which direction is the water flowing and how do you know?



46. What is the disadvantage of living on the west side of the island of Sumatra? What proof can you find on the map?



47. What information, if any, is missing from this graph?



48. How could plate tectonics be used to explain the hot springs found in both Iceland and Japan?

A3. Other Geography Short Answers: Sprite's Quest: Seedling Saga

Answer two or three of these questions as best you can.

49. What does "place" refer to in geography?

50. What does "liveability" refer to in geography?

51. What types of things might geographers look at to understand liveability in a particular area?

52. What is "sustainability"?

53. Briefly describe this graph's pattern.

Appendix B. Post-Questionnaire Questions

B1. Physical Geography Definitions

11. What does "weathering" mean?

- a) a distinct layer of soil encountered in the vertical section
- b) work performed according to a binding contract between two parties
- c) a flowing mixture of water and debris that forms on the slopes of a volcano
- d) the breaking down of rocks, soil, and minerals through contact with the earth's atmosphere

12. What does "erosion" mean?

- a) rain that becomes more acidic than normal
- b) the process by which the surface of the earth is worn away
- c) when water is turned into gas
- d) a fracture of the earth's crust

13. What are "tectonic plates"?

- a) plates that glide over the Earth's mantle
- b) a permanently frozen layer of rocks
- c) a line of bold cliffs
- d) an area of diminished precipitation on the downside of a mountain

14. What are the phases of the "water cycle"?

- a) liquid, gas, land
- b) liquid, solid, gas
- c) liquid, solid, ether
- d) solid, gas, bubbles

B2. Physical Geography Short Answers

15. What does "place" mean in geography?

16. What does "liveability" mean in geography?

17. What types of things might geographers look at to understand liveability in a particular area?

18. What is "sustainability"?

B3. Questions Directly Related to The Videogame

19. What are three geographical objects someone might find in Hawaii?

- a) _____
- b) _____
- c) _____

20. Choose one of the objects above and explain how and why it is important for people living in that area.

21. What are three geographical objects someone might find in New York City?

- a) _____
- b) _____
- c) _____

22. Choose one of the objects above and explain how and why it is important for people living in that area.

23. What are three geographical objects someone might find in The Himalayas?

- a) _____
- b) _____
- c) _____

24. Choose one of the objects above and explain how and why it is important for people living in that area.

25. What are three geographical objects someone might find in Costa Rica?

- a) _____
- b) _____
- c) _____

26. Choose one of the objects above and explain how and why it is important for people living in that area.

27. What do the arrows show on the diagram?

28. Which direction is the water flowing and how do you know?

29. What issues would Hawaiians face given that they rely on imports for many of the goods they use in their daily lives, such as oil?

30. Why won't our typical local farming techniques (tractors and large fields) work in mountain ranges? Why are different crops grown in different regions?

31. What is the disadvantage of living on the west side of the island of Sumatra? What proof can you find on the map?

32. What information, if any, is missing from this graph?

This is the end of the survey.
Thank you.

Article

Model Matching Theory: A Framework for Examining the Alignment between Game Mechanics and Mental Models

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Abstract

The primary aim of this article is to provide a comprehensive review and elaboration of model matching and its theoretical propositions. Model matching explains and predicts individuals' outcomes related to gameplay by focusing on the interrelationships among games' systems of mechanics, relevant situations external to the game, and players' mental models. Formalizing model matching theory in this way provides researchers a unified explanation for game-based learning, game performance, and related gameplay outcomes while also providing a theory-based direction for advancing the study of games more broadly. The propositions explicated in this article are intended to serve as the primary tenets of model matching theory. Considerations for how these propositions may be tested in future games studies research are discussed.

Keywords

game-based learning; game mechanics; media effects; mental models; model matching; skill acquisition; video games

Issue

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1. Introduction

Games, whether analog or digital, are governed by sets of game mechanics through which players attempt to overcome the game's challenges. Players' interactions with a game's mechanics provide a starting point from which researchers can examine outcomes related to gameplay, including developing general cognitive abilities (Green, 2018), learning academic content (Laski & Siegler, 2014), enjoyment (Oliver et al., 2016), feelings of aggression or hostility (McGloin, Farrar, & Fishlock, 2015), and/or experiences of direct skill transfer from gameplay to external situations (Korteling, Helsdingen, & Sluimer, 2017).

However, players' in-game decision-making is influenced by more than just a game's mechanics. In ev-

ery gaming scenario, players bring their own sets of skills, knowledge, and previous experiences, which directly influence players' interpretations of game mechanics and in-game decision making. Players' knowledge structures have been characterized as sets of *mental models*, which are conceptualized as cognitive representations or mental simulations of real or imagined situations (Roskos-Ewoldsen, Roskos-Ewoldsen, & Dillman Carpentier, 2002) that are formed through previous experiences, including both personal and mediated interactions. It has often been suggested that mental models have an analogical relationship to the situations they represent (Craik, 1943; Doyle & Ford, 1998; Landriscina, 2013). In other words, the *relations* among entities in an individual's mental model of a certain situation should match the relations among entities in that situation.

More specifically, mental models match individuals' *perceptions* of the relations among entities in that situation (Doyle & Ford, 1998). As players interact with games, they construct, activate, and apply their mental models. This premise has served as the foundation for the application of a mental models approach to examining media effects, including those related to videogames (Roskos-Ewoldsen et al., 2002).

The mental model construct has been previously applied to a wide range of media related investigations, including: message effects (Cappella & Street, 1989), political advertising (Biocca, 1991), game-based learning (Martinez-Garza & Clark, 2017), and media priming (Roskos-Ewoldsen et al., 2002). The application of mental models in media effects studies has often revolved around the processing of visual images and their ability to create and activate related cognitive networks of associated ideas, concepts, or behaviors. Johnson-Laird and Byrne (1991) considered the iconic qualities of visual images that help individuals create associative cognitive networks for a given image, which then becomes linked to other iconic images and ultimately creates a mental model for a particular thing, person, event, etc. The results of these media priming studies have often been explained through the framework of mental models. Researchers argue that the accessibility of mental models may influence how media primes shape an individual's thoughts, such that more accessible mental models may shape the manner in which the media is perceived and interpreted (Roskos-Ewoldsen et al., 2002).

The process of efficient information processing as explained by researchers in their application of the mental models theory is based on the individual's ability to create and then access a network of linked models that are then utilized to make sense of new experiences based on a system of possibilities (Craik, 1943). Therefore, a direct or interactive experience with media provides a learning opportunity for users to evaluate the possibilities surrounding both existing and new mental models (Craik, 1943). Researchers posited that as a result of interactions with media, individuals draw inferences about their existing mental models and how they should respond or react to new related scenarios. Johnson-Laird (2005) describes this process as sentential reasoning, in which connectives such as "if" and "or" are used by the individual to help develop and advance their mental models based on new information. More recently, games researchers have sought to explore the foundations of these premises more closely, by focusing on the specific process in which a user's mental models are activated, utilized, and refined as part of a mediated experience (Martinez-Garza & Clark, 2017). The emphasis of these explorations hinged on the process of how a users' existing mental models might be applied or aligned with the new game models being encountered in a gaming scenario. The fewer models an individual needs to rely on for an inference, the more efficient and effective their subsequent action should be (Johnson-Laird, 2005). This

process is driven by a belief that spatial and temporal reasoning are likely to be improved when the individual can easily call upon related models (Byrne & Johnson-Laird, 1989). Therefore, an individual's response to media is thought to be an outcome of the process in which individuals activate, construct, and apply their mental models. Depending on the individual's experiences and activation of those mental models, it is thought that some mental models become more or less accessible over time (Roskos-Ewoldsen et al., 2002).

Humans have a strong desire to expand their knowledge and understanding through controlled exploration (Kaplan, 1992). Humans also desire the opportunity to build upon their existing mental models in a manner that provides feedback and allows them to integrate new information into existing knowledge structures. Given these needs, games provide players a unique opportunity to learn and experience "new" things in a controlled and relatively safe environment. While the consumption of any media involves a variably active process of sense-making, games go beyond more traditional media by *requiring* players to be active participants in the process (Bowman, 2018). In fact, researchers have examined players' alignment of their mental models with a game's mechanics in an effort to predict and explain the process by which players' mental models develop over time (Wasserman & Bowman, 2018). Games allow players to interact, respond to, and shape the play experience, providing the raw materials for the mental models that are activated, developed, and/or refined over time. However, games are not just another media source for audiences to consume as narrative or visual media content; rather, the raw materials provided by game experiences are the interactive mechanical structures that change audiences into players (a more thorough discussion of game mechanics and their role in games is presented below). Therefore, the uniquely interactive experience that games provide allows researchers to specifically focus on the process by which an alignment of models occurs between a player and a game with an emphasis on how this process can predict and explain the effects of games, a process described as model matching (Boyan & Sherry, 2011).

1.1. Overview of Model Matching

The primary aim of this article is to present the theoretical process of *model matching*. Before explicating each theoretical proposition in detail below, we overview the theory, which ultimately posits that: (a) greater alignment between a player's mental models and a game's mechanics better affords mental model transfer, and (b) mental model alignment and transfer influence a range of related outcomes, such as immersion (see Biocca, 1997), flow (see Sherry, 2004), in-game performance (see Ritter & Schooler, 2001), learning (see Martinez-Garza & Clark, 2017), and/or game transfer phenomena.

Matching refers specifically to the extent and accuracy of alignment of a player's mental models with a game's constellation of mechanics. Game mechanics can be broadly described as the backbone of any game, or more specifically as the particular components that provide players possibilities for action within the game (Hunicke, LeBlanc, & Zubek, 2004). Model matching and mental model development are iterative processes that occur incrementally over time. In this process, players apply their mental models to decision-making during gameplay and revise their mental models to reflect comparisons between predicted and observed outcomes (Landriscina, 2013). Through iterative refinement via gameplay and mental simulation, an individual's mental models should over time come to more closely match the relations among the game's mechanics (Boyan & Sherry, 2011). In other words, the more players refine their mental models by comparing their observations to their mental simulations, the better their mental models correspond to the game mechanic system. By extension of this logic, when game mechanics represent a situation external to the game itself, mental models of the game may be applied to understanding its referent external situation (Martinez-Garza & Clark, 2017). For example, in a realistic golf game, the better a player's mental model matches the interrelationships among golf club selection, golf balls, wind, and golf course characteristics, the more they should be able to apply this mental model to playing physical golf. Similarly, the greater fidelity with which games simulate *external situations* (i.e., situations not from a particular videogame per se), the more opportunity players should have to transfer preexisting mental models of the external situation to gameplay (Landriscina, 2013).

Model matching has been applied to a variety of contexts within the study of games (e.g., motion capturing controllers, McGloin, Farrar, & Krcmar, 2011, 2013; exergaming, McGloin & Embacher, 2017; game-based learning, Wasserman & Banks, 2017). In addition to research explicitly applying model matching as a guiding framework, related scholarship supports the tenets and logic of model matching. Examples include studies of how mechanical game features impact players in a range of contexts, including: transfer from previous gaming experiences to new gameplay situations (Blumberg, Rosenthal, & Randall, 2008), transfer from sports videogames to real-world sports situations (Downs & Oliver, 2016), use of simulation games as training for pilots (Korteling et al., 2017), and the role of videogame playing experience in training laparoscopic surgeons (Rosser et al., 2007).

In sum, research into the process of model matching has tested assumptions regarding relationships among players' mental models, game mechanics, and external situations. However, there has been no formal attempt to organize the framework underlying this research into a set of specific guiding theoretical propositions. Formalizing model matching as a theory will provide researchers a unified explanation for a variety of game effects while

also providing a theory-based direction for advancing the study of games. Therefore, the primary aim of this article is to provide an organized explanation of the model matching process and its theoretical propositions to formalize model matching as a theory.

2. Model Matching Theoretical Propositions

Given the application of the model matching framework to previous research, its congruence with existing research on the effects of gaming, and its potential for future development, we propose and explicate five propositions to formalize model matching as a theory. These theoretical propositions operate under the following boundary conditions:

- (a) Model matching theory as formalized in this article applies only to mental models of game mechanics, which are distinct from—but likely related to—mental models of non-mechanical game content (e.g., narrative structures, avatar appearances, fictional universes, social relationships);
- (b) Individuals engage games in a goal-directed manner, utilizing or exploring game mechanics in the pursuit of some goal—e.g., overcoming in-game challenges or improving understanding of a game's mechanics.

2.1. Proposition 1: Game Models Comprise a Collection of Game Mechanics that Provide Players with Affordances and Constraints for Game Action

Game models are constituted by interconnected game mechanics that govern players' in-game actions by dictating what is and is not possible (Boyan & Banks, 2017). Game mechanics are characterized in the context of the Mechanics, Dynamics, and Aesthetics (MDA) model, which provides a formal framework to game design and defines game mechanics as the "various actions, behaviors and control mechanisms afforded to the player within a game context" (Hunicke et al., 2004, p. 3). Game mechanics have three primary characteristics that are worth noting. First, game mechanics are impersonal. They react and respond in an identical fashion to the same inputs, regardless of individual players. Second, game mechanics are transparent. Individuals can play regardless of their depth of understanding of the game's mechanics. Third, game mechanics stand in for human action. For example, specific and often impractical tasks (e.g., reloading a weapon, picking up and/or carrying multiple items) are offloaded to the gaming system (see Boyan & Banks, 2017).

Furthermore, game mechanics operate as individual affordances that provide opportunities and constraints for players' in-game behavior and decision making. *Affordances* in this context are what the game's mechanics offer the player as a means of interacting with the game environment, often but not always in an attempt to over-

come the game's specific challenges. This conceptualization of affordance is based on Gibson's (1979) *theory of affordances*, which proposes that "the affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill" (Gibson, 1979, p. 127). In the context of gameplay, game mechanics furnish players with options for action in the game environment. The resulting gameplay is a behavioral manifestation of the player's perception of and interaction with those mechanics or affordances (Hunicke et al., 2004). Ultimately, a player's relative success or failure in a game is a result of the player's interaction with the game's mechanics, as the player provides the input to specify the conditions and actions that influence the outcomes of the game.

Typically, numerous mechanics operate simultaneously within each game: input mechanics directly connect the game control scheme to action in the game avatar, mechanics regulate players' actions and limitations, and world mechanics dictate how non-player objects and characters interact. Each mechanic and their interconnections must be learned in order to master a game. Consider the popular *Mario Kart* family of Nintendo racing games. In most versions of *Mario Kart*, the directional pad/stick controls vehicle steering, one button accelerates, another button brakes, and yet another button controls the use of items. Players could complete a race only using the acceleration and directional buttons; however, if players want to succeed, they must engage the various mechanics in sync. Strategic acceleration into curves maximizes time spent at higher speeds, using items strategically can bolster one's position on the course, and advanced players can use the power-slide technique to reduce their track times.

Furthermore, it is typical to see certain game models copied or shared across similar games or genres. Designers integrate a common game mechanic in games that come from the same genre to help define the genre and give a common background for players interacting with a new game. In the *Mario Kart* example above, similar power-slide mechanics are present in many racing games. The exact control mechanics and physics may differ, but the basic existence and function of a power-slide is a part of many racing game models. By including shared mechanics across games, developers encourage players to cultivate, refine, and apply mental models across implementations of similar game mechanics (see Hunicke et al., 2004).

2.2. Proposition 2: Players Create and Apply Mental Models as a Means of Making In-Game Decisions

In order to navigate game models and pursue their goals in a game, players draw on their existing mental models and develop new mental models specific to a given game. During gameplay, players are presented with typically audiovisual cues that represent some entity or phenomenon. Players rely on these cues to activate cogni-

tive networks related to the cues and their related constructs to help them identify an appropriate means of interaction. Initial application of existing mental models during gameplay begins with iconicity, or perceived similarity between a representation and the thing or concept that it represents (Bergman & Paavola, n.d.). Game stimuli can activate existing mental models (a) by mere *similarity*, as when visual or auditory game features (e.g., the appearance of Mario) bring to mind an existing mental model that shares these features (e.g., of a previously-played Mario game), or (b) by *analogy*, as when relationships among game features (e.g., a mini-map that diagrammatically represents in-game locations relative to an avatar's current location) bring to mind an existing mental model that shares these relationships (e.g., a map on a smartphone that diagrammatically represents geographic locations relative to an individual's current location). These existing mental models provide the basis for understanding a game. Iconicity allows players to access appropriate existing mental models as a means of providing a framework of possibilities for how these entities or phenomena may respond to different inputs (Craik, 1943). As a result, players activate a range of possibilities and determine which outcome provides the most effective solution.

Research on counterfactual processing provides empirical support for the application of mental models to making predictions and decisions. Gerstenberg, Peterson, Goodman, Lagnado and Tenenbaum (2017, p. 4) tested a counterfactual simulation model, which posits that individuals activate cognitive simulations comparing what *has* happened during an event with what *would* have happened if part of the cause had been absent or different. These cognitive simulations or "runnable mental models" are based on individuals' existing sets of knowledge structures on a given topic. Using eye-tracking software, the researchers found support for their hypotheses that participants would compare what actually happened during a virtual game simulation of billiards balls striking each other with what would have happened had the balls not struck each other in the manner that they did. These findings indicated that individuals activated counterfactual mental models when sorting through their decision-making, suggesting that individuals rely on and apply existing mental models to evaluate possible outcomes in an effort to improve actions to achieve desirable outcomes.

Players' mental models are unique and independent from game models. The structure of a game and the particularities of players' actions during gameplay shape their subsequent mental representations (Laski & Siegler, 2014; Siegler & Ramani, 2009). However, mental models can originate from external situations in addition to game models. While game models likely influence the mental models players activate, individuals' responses to gaming stimuli are a byproduct of this activation process. For example, research on natural mapping motion capturing controllers suggests that game mechanics in-

fluence which existing mental models players apply, with consequences for gameplay outcomes. Specifically, it has been found that players experienced greater immersion (McGloin et al., 2011, 2013) and enjoyment (McGloin et al., 2011) during gameplay when game controls for performing in-game behaviors were analogous to performing them out-of-game (i.e., swinging a tennis racket, throwing punches), compared to those players who utilized traditional game controllers with buttons and directional pads/joysticks. These findings suggest that players' existing mental models were better aligned with naturally mapped controllers than with traditional game controllers. In contrast, Bowman, Pietschmann and Liebold (2017) suggested that in certain gaming situations, players may have more developed mental models of traditional videogame controllers and thus may prefer traditional controllers to motion controllers. Collectively, these findings suggest that while mental models are not reducible to game models, players use their existing mental models, whether of sports or of gamepads, that best match a game's mechanics. As such, an individual's initial mental models provide a foundation for subsequent gameplay.

2.3. Proposition 3: Players Refine Mental Models of Game Models through Repeated Engagements with a Game

Individuals' existing mental models, whether of other games or external situations, may not always be 100% accurate and thus may not always align with a game in a fashion that produces the most desirable outcomes (see Craik, 1943; Doyle & Ford, 1998). As players repeatedly engage with a game, they gradually refine their mental models such that their mental models tend to match game models more accurately. Players refine their mental models through an iterative process of trial and error (Boyan & Sherry, 2011; Gee, 2007), capitalizing on the runnable or simulative nature of mental models (Craik, 1943). By (a) running mental models to generate predictions about the consequences of certain actions or potential future game states and (b) comparing these mental simulations to actualized outcomes, players can evaluate the reliability of their mental models for making accurate predictions. Simulating potential outcomes with mental models enables individuals to make predictions about the future (Battaglia, Hamrick, & Tenenbaum, 2013) and to make counterfactual inferences about cause-and-effect (Gerstenberg et al., 2017). If predictions are accurate, we expect players' mental models will be reinforced. If predictions are inaccurate, we expect players' mental models will be modified based on the disconnect between their predictions and observations. Although players' engagement with games typically manifests as gameplay, it can also involve solitary practice or formal instruction (Charness, Tuffiash, Krampe, Reingold, & Vasyukova, 2005), discussion of strategies among peers (Sharritt, 2008), or investiga-

tion of underlying game mechanics (e.g., theorycrafting, Steinkuehler & Duncan, 2008).

Games provide players three affordances in particular that support iterative mental model refinement. First, at a basic level, players can replay games in whole or in part, which offers players the ability to learn game models over time, even after making inaccurate predictions. For example, after failing a game objective, players are typically able to replay the game from the beginning or from a saved checkpoint. Failure can be productive for mental model refinement, particularly when failure prompts players to metacognitively appraise the disconnect between their mental models and game models and to subsequently acquire additional information to revise their mental models (Lee, Liu, Jullamon, & Black, 2017). Second, many games gradually increase in difficulty, which scaffolds iterative learning by providing players cognitively manageable challenges along with doses of failure. Incrementally introducing elements of the game model enables players to test and retest limited components of their mental models, which improves players' performance when overcoming a game's challenges (Kopainsky, Alessi, Pedercini, & Davidsen, 2015). Third, other players, whether opponents or teammates, player-controlled or artificial intelligence, provide additional resources for mental model refinement via vicarious learning. By observing the strategies of other players and their concomitant successes or failures, players can vicariously learn about effective (or ineffective) strategies that contribute to their understanding (Weintrop & Wilensky, 2013).

Broadly, the more individuals play a particular game, the more closely their mental models match the game model (Wasserman & Bowman, 2018). Further indirect evidence for iterative refinement of mental models manifests as learning curves of game performance (Ritter & Schooler, 2001). Over time, as players repeatedly engage with games in various ways—including play, solitary and group practice, instruction, and the use of other resources—their skill and game performance gradually improve (Charness et al., 2005; Stafford & Dewar, 2014). In line with the notion of productive failure, exploring the possibilities and limitations of game models supports mental model refinement during both initial encounters with a game and as players face later challenges. Although exploration may lead to short-term failure as players attempt unsuccessful strategies, early exploration of game models facilitates more successful long-term game performance (Stafford & Dewar, 2014) and may be characteristic of more skilled players (Stafford, Devlin, Sifa, & Drachen, 2017).

2.4. Proposition 4: Alignment of Game Models and External Situations Can Facilitate the Player's Transfer of Mental Models between Game and External Situations

The ability of individuals to transfer mental models between games and other non-game contexts, or *exter-*

nal situations, is influenced by the degree of alignment between game models and external situations. Specifically, we posit that the closer a game model aligns with an external situation, the greater the potential for mental model transfer. Applying mental models of games to external situations relies on the capacity of game mechanics to simulate aspects of reality (Landriscina, 2013). Under ideal conditions, individuals should be able to apply their mental models of games to external situations to help structure their understanding of new information and to enact effective behaviors (see Korteling et al., 2017). This process should allow individuals the same predictive and interpretive capacities as proposed for model matching that takes place between different gameplay contexts.

The efficacy of this transfer process depends not only on (a) the match between mental models and game models, but also on (b) the accuracy of the match between a given game model and the external situation to/from which transfer is attempted (Martinez-Garza & Clark, 2017). For example, transferring mental models of playing drums in a band to playing drums in a music videogame should be more successful the more accurately the gameplay resembles the process and activity of playing drums. In the reverse direction, game-based learning also exemplifies this process, in which transferring mental models from gameplay to academic contexts is the explicit goal (Boyan & Sherry, 2011). For example, transferring mental models of microeconomics acquired from managing a business in a management game to an academic context should be more successful the more accurately the game model aligns with microeconomic principles. Indeed, number games with linear counting-on mechanics have been found to improve children's mental representations of number lines that transferred to subsequent arithmetic learning (Laski & Siegler, 2014; Siegler & Ramani, 2009).

Mental model transfer can take several specific forms. Individuals can apply their mental models wholesale to new contexts or, alternatively, individuals' existing mental models can heighten their sensitivity to particular elements, relationships, or dynamics in a given situation. As an example of wholesale mental model transfer, in a realistic F-16 flight simulator, in comparison to gamers who played civilian aircraft flight games, gamers who played an F-16 flight game performed better on simulation tasks specific to the F-16, but demonstrated less differences on more general flight-related simulation tasks (Korteling et al., 2017). As an example of transfer as heightened sensitivity to particular features, experts of the historical videogame *Civilization* exhibited deeper understandings of a college-level history textbook chapter than experts at the city building game *SimCity*—despite no prior differences in historical knowledge (Black, Khan, & Huang, 2014). These findings suggest that playing games featuring mechanics that more closely match a particular transfer context (e.g., flying an F-16 or understanding historical processes) facilitates transfer of

mental models from games to external situations. Mental model transfer also proceeds in the reverse direction, from external situations to games. For example, both prior videogaming experience and real-world driving experience have been found to enhance racing game performance among individuals with limited racing game experience (Koban, Liebold, & Ohler, 2015), supporting the notion that individuals' preexisting mental models developed from both prior gameplay and real-world experience can be transferred to subsequent game encounters.

2.5. Proposition 5: The Degree of Alignment of Mental Models to Game Models Impacts Media Effects

In addition to the process by which players transfer their mental models between games and external situations, the degree of alignment between mental models and game models likely influences players' experiences and other effects associated with gameplay. That is, the degree to which players can overcome challenges with the mechanics given by a game model should influence other media effects. For example, if players cannot understand or overcome basic challenges in a game, it often becomes frustrating, leading to lower enjoyment (Sherry, Rosaen, Bowman, & Huh, 2006). We posit that degree of alignment of mental models with game models should influence various gaming outcomes. The following examples are not meant to be exhaustive, but rather to exemplify the capacity of model matching theory to explain and predict established media effects.

Foremost, we posit that when mental models and game models are more closely aligned, players should exhibit more successful game performances. Improved performance is likely due in part to rejecting poorly-performing alternative mental models that are less accurate and/or overly complex. As Johnson-Laird (2005) suggests: "The fewer the models needed for an inference, and the simpler they are, the less time the inference should take and the less prone it should be to error" (p. 193). In other words, by reducing the number and complexity of potential mental models, model matching yields faster and more accurate predictions, in turn yielding improved spatial and temporal reasoning (Byrne & Johnson-Laird, 1989). In addition to having accurate mental models to choose from, experts in particular domains (i.e., those with more accurate mental models) recognize patterns and features intrinsic to game models that novices miss due to their orientations toward more superficial characteristics in problem solving (Leone, Fernandez Slezak, Cecchi, & Sigman, 2014). Over time, experts have built mental models that integrate factual and deep domain knowledge with understandings of the relationships between the elements of a situation and likely outcomes in problem solving scenarios. Thus, players with more accurate mental models (i.e., experts) should perform better in games because of practice effects and a more efficient ability to cognitively search for information or solutions (Bogard, Liu, & Chiang, 2013).

Model matching theory can also predict and explain several media effects related to success in challenging and/or competitive gaming scenarios. Enjoyment is one result of the media flow state (Sherry, 2004), and flow theory contains several propositions that complement model matching theory. Flow is an experiential state characterized by extreme focus on an activity, loss of the sense of time passing, and feelings of enjoyment. Flow is thought to result from a balance between a person's skill in a given activity and the difficulty of the activity. When individuals engage in activities for which challenge and skill match, the resulting state is flow (Csikszentmihalyi, 1997). When an individual's skill exceeds the challenge, the result is boredom, and when challenge exceeds an individual's skill, the result is frustration. Only in the intermediate zone where skill and challenge match does flow occur. Alignment of mental models with game models likely plays a role in this process. As aforementioned, game challenges are intimately related to game models, and players' skills are a product of their mental models. Thus, alignment between game models (a source of challenge) and mental models (a source of skill) should increase enjoyment, immersion, and other flow state-related experiences (McGloin, Farrar, Krcmar, Park, & Fishlock, 2016).

Of particular interest to media scholars is how model matching theory might complement existing approaches to studying game effects, especially models that attempt to address the effects of videogame content on player thoughts and behaviors. For example, the general aggression model (GAM) has been widely used as an approach for understanding the impacts of videogame content on particular kinds of outcomes related to aggression (Bushman & Anderson, 2002). Predictions using GAM differ from model matching theory in that GAM studies have focused primarily on the game's audiovisual content as opposed to the game's mechanics. Researchers applying a GAM-based approach typically contrast games with similar mechanics but different on-screen content, such as a driving game with either a gun or a tennis racket in the passenger seat (Bushman, Kerwin, Whitlock, & Weisenberger, 2017). In these studies, research questions are focused on the meaning-making of the (aggressive) content of the game or media, which is derived from GAM's theoretical underpinning in schema theory (Bushman & Anderson, 2002).

Schema theory posits that individuals build knowledge structures in the form of relatively static, stable guides for reactions to regular and routine situations, or scripts, out of stimuli they encounter (Jones, Ross, Lynam, Perez, & Leitch, 2011). GAM proposes that as players observe aggressive media content over time, they integrate those violent actions into their schemas of appropriate responses to confrontational situations. This approach aligns closely with schema theory, which posits that individuals observe and update scripts in order to obtain behavioral guidance for general life scenarios. Model matching theory differs from GAM in its emphasis on in-

teraction with game *mechanics* rather than audiovisuals, and on *mental models* rather than schemas.

Mental models are conceptually similar but distinct from schemas. Whereas schemas are relatively generic, relatively static templates for how to behave and the events that occur in a type of situation or context, mental models are more precise dynamic mental simulations of spatiotemporal, logical, and causal relationships in a particular situation (Jones et al., 2011). This emphasis on mental models in model matching theory is tied to the centrality of game mechanics and interactivity in games. Game mechanics constitute the spatiotemporal, logical, and causal relationships in the game model with which players interact during gameplay. By centering game mechanics and interactivity, model matching theory is distinct from GAM and other more observation-based learning theories that have been applied to gameplay outcomes (e.g., transportation imagery model, social cognitive theory) in its emphasis on characteristics of games that are relatively distinct from other media.

2.6. Testing Model Matching Theory's Propositions in Future Research

In order to further advance model matching theory as currently formulated, in addition to aforementioned literature that supports these propositions, researchers will need to further evaluate the theory's formalized propositions with a focus on how alignment between mental models, game models, and external situations influence particular outcomes. Recent literature examining cognitive skill acquisition and videogaming suggests gaming skills often do not transfer to external situations (Sala, Tatlidil, & Gobet, 2017). Model matching theory's emphasis on mental models of game models (i.e., constellations of game mechanics) may provide a way forward for understanding conditions under which transfer is more or less likely. Characteristics of game models should also be evaluated for their ability to promote greater alignment of mental models of games with mental models of external situations, which could facilitate the transfer of game-related mental models and promote outcomes related to direct learning.

Research into how differences among players' mental models influence the alignment process is also needed. Specifically, researchers may look to see how prior experience with a game genre influences initial alignment of mental models and game models, as well as the rate of subsequent improvement. Along similar lines, investigations related to the process in which mental models are developed are also needed. Does engaging in multiple iterations of gameplay allow players to more accurately align their mental models to game models, as well as to transfer those mental models to other contexts more easily or successfully?

In addition to the theory's testability, it may also be useful in explaining why certain outcomes or effects have taken place. Games designed to enhance learning or in-

crease a player's skill set related to some external situation may have varying effects depending on how well the player was able to align their existing mental models to the game model. Thus, model matching theory may be useful to researchers seeking a theoretical explanation for why certain games or encounters with games are only capable of increasing learning related outcomes for some players but not all. What traits, practices, or cognitive orientations promote more rapid and/or more accurate model matching? From a more meta-analytic perspective, researchers may wish to synthesize studies consistent with model matching theory to determine how varying degrees of alignment among mental models, game models, and external situations influence aforementioned outcomes. For researchers examining the influence of technological affordances (e.g., virtual reality, kinesic inputs) on gaming experiences, model matching theory may provide a means of predicting and explaining the influence that these affordances have on the individual's ability to align and refine their mental models with the game's models.

Finally, future research should probe the boundary conditions of the theory to identify fruitful alterations or expansions. Specifically, the appropriateness of applying model matching beyond the boundary condition of mechanical game content could be tested to determine if the theory may be parsimoniously expanded to apply to non-mechanical game content as well. During future theory development, it will be critical to specify whether and how the process of mental model utilization and revision differ between game mechanics and non-mechanics. For example, does model matching apply to gameplay during which game mechanics are not central to a player's decision-making process? Roleplaying and/or world building scenarios may present unique contexts for examining whether model matching is applicable to engagement with non-mechanical game content, and if so, how it may differ from engaging a game's mechanics. The appropriateness of applying model matching beyond the boundary condition of players actively engaging the game with deliberative purpose should also be probed. Players may often interact with a game less deliberately, as when they rely on simple heuristics to progress through the game rather than mental model simulations (Martinez-Garza & Clark, 2017). Thus, future research will need to examine if/how a player's intentions (e.g., deliberative attempts to overcome challenges versus non-deliberative exploration) influence the model matching process.

3. Conclusion

Model matching theory focuses on the process through which players align and match their preexisting knowledge structures with a game's mechanics in an effort to overcome the game's challenges. Model matching theory makes specific predictions about how players will revise their mental models and how the match between a game model and an external model can have an influ-

ence on the effects of the gaming experience as well as its ability to influence outcomes related to mental model transfer. Model matching theory also provides a theoretical framework for scholars to explore new questions about games and their effects. The propositions laid out in this article are intended to serve as the primary tenets of model matching theory, and therefore these tenets must be tested in future research as a means of evaluating and refining them.

Model matching theory describes a process with which game studies scholars can examine dynamic interactions of players and game mechanics to predict and explain how the alignment of game models, mental models, and external situations influences transfer of mental models to external situations and application to real world situations. By emphasizing the role of cognitive mental models of game mechanics, model matching theory provides a foundation for researchers to investigate the effects of games utilizing a dynamic perspective that emphasizes the interactive nature of games.

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Conflict of Interests

The authors declare no conflict of interests.

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Article

The Form of Game Formalism

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Abstract

This article explores how the concept of formalism and the resulting method of formal analysis have been used and applied in the study of digital games. Three types of formalism in game studies are identified based on a review of their uses in the literature, particularly the discussion of essentialism and form that resulted from the narratology-ludology debate: 1) formalism focused on the *aesthetic form* of the game artifact, 2) formalism as *game essentialism*, and 3) formalism as a *level of abstraction*, related to formal language and ontology-like reasoning. These three are discussed in relation to the distinctions between form and matter, in the Aristotelian tradition, to highlight how the method of formal analysis of games appears to be dealing with matter rather than form, on a specific fundamental *level of abstraction*, and in turn how *formal analysis* becomes a misleading concept that leads to unnecessary confusion. Finally, the relationship between *game essentialism* and the more computer science-centric approach to *ontology* is studied, to account for the contemporary trend of identifying the unique properties of games and opposing them with properties of, e.g., traditional storytelling media like literature and film, explored through their *aesthetic form*.

Keywords

aesthetic formalism; game formalism; game studies; research methods; research ideologies; Russian Formalism

Issue

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1. Introduction

Game studies is a relatively new and growing discipline, influenced by many related fields. As games become increasingly popular with new types of players, the academic interest in studying games is increasing too. However, in the emergence of a new field or discipline, we have to be careful with the direct application of existing methods and theories (Aarseth, 2001). If we force upon the study of games frameworks developed for studying other types of media, we will never understand exactly how games, and specifically digital games, differ from more traditional types of media, such as literature and film. Inevitably, the study of games will happen inside institutional structures and well-established fields, but this does not mean that games should be reduced to the traditions of these fields (Aarseth, 2001).

This article will examine one specific approach to the study of games, namely that of formalism, or, in this par-

ticular case, the idea of a certain branch of *game formalism*. The tradition of formalism is often understood in the context of, and related to, the study of literature, particularly the historical entities of Russian Formalism and New Criticism, but, as I will present it, formalism can be understood as both research ideology and method, and there are various ways in which the term has been used and altered for the study of digital games. This article will illustrate how we can distinguish between three types of formalism within the field of game studies:

- 1) formalism focused on the *aesthetic form* of the game artifact;
- 2) formalism as *game essentialism*;
- 3) formalism as a *level of abstraction*, related to formal language and ontological reasoning.

The three types of formalism will be uncovered and explored in relation to the method of formal analysis, to

outline the difference between research perspectives, ideologies, and methods. The discussion of the often-problematised distinction between ludology and narratology will be used as a point of departure for uncovering various ways of focusing on form in game analyses, and will inform the distinctions made between the three types of formalism presented above. Moreover, the distinction between *form* and *matter* (sometimes *content*), as first outlined by Aristotle and since explored and studied by many theorists, will be used to account for key differences between formalism-as-research-ideology and formalism-as-method, as the method of formal analysis (of games) tends to focus on listing the content of a given object or text, rather than defining its basic form.

2. From Plato to Games: A Short History of Formalism

Formalism can be traced all the way back to the ideas of Plato presented in his *Theory of Form*. He argued that beauty is a property that various objects can have, and therefore that it is a universal property: “The Form of Beauty manifests itself in all the different things, in all the different ways, we call ‘beautiful’” (Lacewing, 2007, p. 1).

Plato’s student, Aristotle, who stated that every physical object is a compound of matter and form, developed this first approximation of formalism further. He argued that “a thing’s form is its definition or essence—what it is to be a human being, for example” (Ainsworth, 2016). In contrast, the answer to the question of what a specific object is made of is the thing’s matter (Ainsworth, 2016). To truly understand an object is to understand its matter (its material cause), form or essence (its formal cause), what made the object come into existence (its efficient cause), and finally the function or purpose of the object (its final cause). To explain the difference between the formal and the material cause, which are specifically relevant for this study, Aristotle uses the example of a house. In a brick house, the material cause (or the matter) would be the actual bricks from which the house is built. The formal cause, which would coincidentally also be the final cause, as it refers to its use and purpose, is the fact that a house is defined as a shelter of a special type. The overlap between the causes in this case can be attributed to the fact that “houses, like all artefacts are functionally defined” (Ainsworth, 2016). Following this, Aristotle notes that although the four causes are all distinct questions, the three latter causes will often have the same answer, as is seen in the final and formal causes of the house (the efficient cause of which can be directly related to both). Yet, when approaching digital games—and also, for example, studies of film and media—we see that very different types of scholarships lead to explorations of each of these four causes: matter and form can be explored through ontological/analytical work, whereas the efficient cause depends on studies of the industry and the development process. The final cause depends on a thorough understanding of player/audience/user-responses.

To highlight the difference between the material and formal cause of digital games, consider a game example like *The Sims*. Following the Aristotelian distinction, the material cause refers to the material of which the game is made; not the source code, as this can be understood as a paratext to the actual, executed game (Willumsen, 2017), but rather the components that make up the game as played. This includes the sim characters, the environment, the buildings, and the more than 400 different objects that can be purchased using in-game currency (Consalvo & Dutton, 2006). These entities become the “bricks” of the game, but so do the rules that guide and limit player behavior, making a full analysis of the game’s material cause rather comprehensive. This is made explicit by the analysis model suggested by Consalvo and Dutton (2006), which consists of the four very broad categories of *object inventory*, *interface study*, *interaction map*, and *gameplay log* (Consalvo & Dutton, 2006). The formal cause, on the other hand, refers to the very essence of the game, which is even less tangible and straightforward to define. The essence of *The Sims* might very well be defined in relation to any game definition, of which there are many (see, e.g., Stenros, 2017, for a comprehensive overview). As Stenros (2017) points out, there are disagreements about what can be considered the defining characteristics of games. This relates to the various attempts at suggesting game ontologies, which will be explored later in this text. For now, it must suffice to say that the essence of *The Sims* will necessarily relate to any assumed definition or ontology of games, where specifics may be added to make explicit the very nature of *The Sims*, to distinguish its essence from other game examples.

The formal cause appears to be the element that many humanist scholars have focused on when exploring their object of investigation from a formalist perspective. This can be seen, for example, in Roman Jakobson’s outline of the *raison d’être* of Russian Formalism, in which he states that literary scholarship should focus not on “literature in its totality but literariness (‘literaturnost’), i.e., that which makes of a given work a work of literature” (Erlich, 1973, p. 628). Isolated from its original context, the focus on the formal cause alone as a primary area of interest made Russian Formalism a very specific “flavor” of formalism, one that set out to explore exactly what constitutes the essence of literature. Other branches of the paradigm of thought presents more pragmatic yet still essence-centric ways of approaching the subject matter (see, e.g., Pötzsch’s, 2017, discussion of different varieties of Russian Formalism). Approaches like the one suggested by Jakobson, i.e. the exploration of the unique properties of a given (class of) objects, are sometimes labeled *essentialism*.

The concept of essentialism, like that of formalism, can be traced back to Aristotle and the idea that certain objects or individuals have essential, definable natures. Such individuals would not survive a change in their essence, but would overcome a change in acciden-

tal properties. Put differently: “an *essential property of an object* is a property that it must have, while an *accidental property of an object* is one that it happens to have but that it could lack” (Robertson & Atkins, 2016, italics in original).

Aristotle linked the thinking about essentialism and form vs. matter in arguing that form and matter must account for non-accidental changes. In his conceptual analysis of change, he states that the change must have three default elements: “(1) something which underlies and persists through the change; (2) a ‘lack’, which is one of a pair of opposites, the other of which is (3) a form acquired during the course of the change” (Ainsworth, 2016). Accidental changes must have an object, or in Aristotle’s terminology a *substance*, to underlie the change in question, whereas substantial changes involve the passing away or coming into existence of a given object/substance. The concept of *form* defines the *essence* of the object or substance in question (Ainsworth, 2016), and thus helps us determine whether a change has brought about a new object or rather altered an existing one—in other words, whether the change has been accidental or substantial.

However, problems arise when attempting to point out the essence of categories of objects, such as literature, but it may be that games pose a particularly difficult problem to Aristotle’s thinking; we seem to be struggling with defining the characteristic of games, and determining what kinds of change we can understand as respectively accidental or substantial. What changes to *The Sims* would cause it to lose its essence as a game? Some changes would surely cause it to lose its essence as *The Sims* but allow it to remain a game, yet such arguments depend on how we understand and define the essence of games. It has been argued that *The Sims* can be understood as a borderline example of a game, as it, being an example of what Juul labels an *open-ended simulation game*, lacks tangible goals (Juul, 2003), making explicit the challenges of exploring the form and essence of games. We still lack a proper terminology to describe when a game ceases being a game *in form*, and takes on another form, e.g. as *interactive fiction*, *cinema*, or in the case of *The Sims* a (*dollhouse*) *simulation*.

3. Formal Analysis in Theory and Practice

In the field of digital game studies, various scholars have attempted to approach games using what they have termed *formal analysis*. An example of this is Lankoski and Björk’s methodological inquiry, in which they argue that “formal analysis focuses on the different elements of a work, that is, asking questions about the elements that constitute the parts of the work and the role of each element in the composition as a whole” (2015, p. 24). Lankoski and Björk’s definition makes central the need for distinguishing between formalism and formal analysis. One often follows the other, but the two are not by default linked, although their names might indicate otherwise.

According to David Myers (2010), formal analysis in literature is the method of the formalists, following the Russian tradition of formalism. Myers states that an example of a typical type of formal analysis would be the close reading practiced primarily by American New Critics. Similarly, Miguel Sicart argues, with respect to games, that “formal analysis is understood as descriptions of game components that can be discerned from others by means of their unique characteristics and properties. *Formal* should be understood in relation to aesthetic formalism, which contrasts ‘the artifact itself with its relations to entities outside itself’” (Sicart, 2008). Here, Sicart builds on Wolterstorff’s (1999; Sicart as cited in Audi, 1999) definition of Aesthetic Formalism as a general type of theory that emphasizes form in the study of the specific, aesthetic artifact. Wolterstorff argues that this type of formalism is best understood as a continuum on which a specific theory can be ranged as more or less formalist, and therefore Aesthetic Formalism is not a specific scientific ideology or theory, but rather as a categorization tool for other aesthetic theories, such as those of literature, music, and film. Thus, it does not make sense to explore *The Sims* in relation to Aesthetic Formalism *per se*, as this becomes a category for theories rather than an applicable tool for assessing the formal qualities of a (game) object. Instead, one must study a game using one of such theories for it to be an aesthetic formalist study.

The approaches from Myers and Sicart illustrate how formal analysis and two specific types of formalism, Russian Formalism and Aesthetic Formalism, have been understood in relation to one another. Myers and Sicart can be seen as representatives of the first two types of formalism listed in the introduction: Sicart focuses on *games as aesthetic objects* that, in the light of aesthetic philosophy, must be of a given form and contrasted to outside entities to be understood as an object of this group (Wolterstorff, 1999). Myers, on the other hand, taps into the more *essentialist* way of thinking that suggests that games, in the same way as some of the Russian Formalists understood literature, have some unique properties that should form the basis of what is studied in the field. It should here be noted that *essentialist* refers to the Aristotelian and descriptive use of the term, not its potential normative meaning. It is in no way meant as derogatory. The unique properties of the object or class of objects are what makes them worth studying and what justifies the establishment of a research field dedicated to the study of games.

However, some game scholars make use of the method of formal analysis without relating it to any specific (literary) tradition of formalism. Such scholars include for example the previously mentioned Lankoski and Björk. They explain:

Formal analysis of gameplay in games takes a basis in studying a game independent of context, that is, without regarding which specific people are playing a specific instance of the game....Performing a formal analy-

sis of gameplay can be done both with the perspective that games are artifacts and that they are activities; in most cases, it blurs the distinction because both the components of a system and how these components interact with each other often need to be considered. (Lankoski & Björk, 2015, p. 23)

Lankoski and Björk's (2015, p. 23) approach, although focused on "understanding how the game system works", embraces one of the unique qualities of digital games; that they are special type of objects that depend on players to exist (Kücklich, 2002). In arguing that the formal analysis can be performed on the activity of playing (in Aarseth's, 2009, terminology, the *game process* as opposed to the *game object*), they distance themselves from Russian Formalism and Aesthetic Formalism and their tendency to focus on the intrinsic properties of the object as opposed to its relationship to outside entities.

This approach to games relates to the thinking of formalism as a *level of abstraction*, related to the need for a formal language that accounts for—and helps categorize—the specific elements of a system. This type of formalism, with its reliance on the construction of ontologies, is maybe best understood in relation to computer science, where an ontology is often defined as a formal naming and definition of entities and their relationships, which exist for a specific domain of discourse (Guarino, 1998, p. 7). Thus, the *formal* in this formalism has not to do with the actual formal matter, as in the Aristotelian tradition, but rather with a rule-bound (and, in the case of games, rule-based) system that superimposes on the developer certain standard procedures for naming and defining elements of said system, following some type of formalized logic.

4. Ludology and Narratology in the Light of Formalism

When approaching formalism in digital games it seems almost impossible to avoid a reference to the debate between narratology and ludology. Some people still defend (either of) the two positions of this discussion, whereas others deny the discussion ever taking place, or ridicule those who still refer to the thing as an actual debate (see, e.g., Frasca, 1999, 2003a; Murray, 2005; Pearce, 2005). Running the risk of upsetting readers who disagree with the radical distinction between the labels of "ludologist" and "narratologist", or find any of the two terms derogatory, some of the meta-comments on the debate may help us better understand the relationship between formalism and formal analysis in the context of game studies.

Following Thomas Malaby, "ludologists ultimately fell into the trap of formalism, treating games as special and distinct activities, fundamentally different from everyday life" (Malaby, 2007, p. 101). This was a result of their attempt at pinning down what may be understood as *gameness*, particularly in contrast to the notions of narrative and story. Malaby continues: "in contrast to

the ludologists' initial focus on experience, the narratologists were overly concerned with *form*, especially the extent to which the product of a game experience can become an object of reflection and interpretation" (Malaby, 2007, p. 101, original emphasis). Yet, the form with which the "narratologists" were occupied was that found in traditional storytelling media, and it has often been suggested that narrative study of digital games forces upon the game models that do not quite fit. This has been attributed to the fact that games, literature, and film are three different types of media with very different properties and materialities (e.g., Frasca, 2003b; Juul, 2005).

Considered in relation to Aristotle's approach to form and matter, it appears as if the "ludologists" attempted to uncover the formal cause of the game object, including its essence, whereas "narratologists" tried to map the material cause to those found in various types of aesthetic artifacts, such as literature and cinema. Janet Murray does not appear to acknowledge the focus on form in the narrative study of games, and she focuses instead on clarifying the "ludologists'" approach to the unique properties of games. In *The Last Word on Ludology v Narratology in Game Studies*, Murray argues:

The ideology [of ludology] can perhaps be called game essentialism (GE), since it claims that games, unlike other cultural objects, should be interpreted only as members of their own class, and only in terms of their defining abstract formal qualities. Separate from this ideology is a methodology which is also called "ludology" but which could perhaps be better named computer game formalism (CGF). As a methodology, CGF emphasizes the formal properties unique to videogames and attempts to analyse them and to create descriptors than [sic] can be used to classify and compare specific instances of game form. (2005, p. 2)

Game essentialism seems a fair and reasonable label for the formalist study of games, when considered descriptive rather than normative, as, following the Russian tradition, the formalist study of texts has always been occupied with uncovering the essential features of the object under investigation. As shown earlier, this matches Aristotle's discussion of the essence being what establishes the formal matter of the substance in question. However, the description of the methodology suggested by Murray poses some problems to the overall distinction between narratology and ludology, and for the empirical object in game analyses: as illustrated by the description of formal analysis offered by Lankoski and Björk (2015), a study of the formal properties of video games does not have to exclude a focus on the player-subject in the same way that the ideology of Game Essentialism would. As a matter of fact, exploring how various types of players relate and react to a digital game may help us understand the game and its unique properties even better, as exemplified by Kristine Jørgensen's (2013) study of gameworlds.

Complicating the matter even further, we can observe that the methodology that Murray labels *Computer Game Formalism*, the focus on properties unique to video games, is actually very close to Malaby's outline of narratology as focused on *form*. The primary difference is its reliance on what we may call *x-essence* or *x-ness*; narrative analysis of games often explore games in relation to an idea of *narrativeness*, defined by the narrative theory chosen for analysis, whereas a ludocentric analysis depends on an understanding of *game-ness*. Both analyses, however, seem focused on the *material cause*, i.e., the content of games, e.g., that studied with regards to *The Sims* by Consalvo and Dutton (2006), rather than the *formal cause*, the latter of which is used for establishing the *x-ness* on which the analysis is built (for example *game ontology*).

Hence, it is possible to argue that ludologists build on the second type of formalism listed in the introduction, that of *game essentialism*, where the unique properties of the object are highlighted as the most central to the study of games in general. Narratologists, on the other hand, build on a non-game specific formalism, and become instead focused on the aesthetic form in general, thus relating to the first type of formalism presented in the introduction, namely that which focuses on the *aesthetic form* of the game object, contrasting it to outside entities, but not simply focusing on its unique properties as a game.

5. Formal Analysis as Material Analysis

The observation outlined above points towards the idea that what is often termed *formal analysis* does not actually engage with Aristotle's formal cause, Jakobson's "literariness", or any specific game form or *game-ness*. Instead, the formal analysis as a research method is an investigation of the matter of the object in question. Thus, it would appear more terminologically correct, when considered from an Aristotelian perspective, to refer to the method as *material analysis* rather than *formal*, although *material* may, to some, appear to relate to the physicality of the object under investigation, rather than its physical and conceptual matter.

When investigating existing studies of games it becomes increasingly evident that most formal analyses actually explore matter or content rather than form, and thus that they easily take the form of the more media-studies specific method of *content analysis*. This is evident in the work by Lankoski and Björk (2015) who, as a means of exemplifying their take on formal analysis, list the various *components*, *actions*, and *goals* for a specific game, in their case PopCap's *Plants vs. Zombies* (2009). Their analysis is very descriptive, as they list the different types of components and their respective actions, map the layout of the environment projected on the screen, and explain various ending- and winning conditions of the game.

The ludocentric formal analysis presented by Lankoski and Björk builds on a third type of formalism,

formalism as a level of abstraction. They build on a computer science tradition of ontologies as they structure their analysis according to certain categories that are understood as the elements constituting the form of the game: the *components*, *actions*, and *goals*. However, formalism as a level of abstraction can be combined with one of the two other approaches to formalism in game studies. Lankoski and Björk appear, in their work with mapping out the constituting elements of the game, to rely also on a game essentialist ideology.

Similarly, narrative material analyses may build on formalist understandings of narrative or *narrativeness*, and at the same time work with formalism as a specific level of abstraction in the analysis. Daniel Vella (2015) illustrates an example of this in his translation of Uri Margolin's (1986) theory of literary characters into the study of game characters and avatars. Here, the elements constituting the character form the basis of the analysis through the categories of *static mimetic elements*, *dynamic mimetic elements*, and *formal textual patterns* (Vella, 2015, p. 375). The analysis becomes a description or summary of the *matter* of the character rather than engaging directly with its *form*, because formalism as a level of abstraction does not deal with form as we know it from Aristotle.

It thus becomes possible to distinguish formalism as a level of abstraction from the two other types of formalism—game essentialism and Aesthetic Formalism. The former can be combined with any of the latter two, but it never actually engages with *form* in the Aristotelian sense. Rather, it deals with the formalized components of a system, or with the *matter* or *content*, at the most basic level possible. In extension to this, we can see that formal analysis is a study of the *matter* or *content* that becomes formal only in its reliance on *ontology* (as a pointer towards *game essentialism*) to form a basis for categorizations applied as analytical models or lenses.

6. From Gameness to Ontology

Having defined three different types of formalism in game studies, and hopefully clarified some of the confusion that may come as a result of applying identical terms for diverse research ideologies and methods, this section will be dedicated to a brief overview of the relationship between *game essentialism*, *formalism as a level of abstraction*, and *formal analysis*, approached through the concept of *ontology*.

Recent years have seen a fascination on the part of game scholars with mapping the fundamental components of games. While this trend is not necessary very new (Avedon, 1971, attempted already in the 1970s to map the basic structural elements of games), modern approaches have been increasingly occupied with what is often referred to as the *ontology* of digital games.

As previously stated, these game-specific ontologies relate to the computer science tradition of the term, which makes them closely resemble taxonomies, where

the hierarchy of entities, the relations between these entities, and naming conventions are central to the construction of the system. An example of this type of ontology is The Game Ontology Project, developed by Zagal, Mateas, Fernández-Vara, Hochhalter and Lichti (2007), in which they state the goal of developing “a game ontology that identifies the important structural elements of games and the relationships between them, organizing them hierarchically” (Zagal et al., 2007, p. 22).

Zagal et al.’s study is just one of many (see, e.g., Aarseth & Calleja, 2015; Björk, Lundgren, & Holopainen, 2003; Bogost, 2006; Hunnicke, LeBlanc, & Zubek, 2004; Järvinen, 2007) that attempt to outline the basic components of games, on a very specific *level of abstraction*, one that is fundamental enough to somehow embrace the *essence* of digital games. As such, these ontological studies can be understood as formalist in two ways: they deal with the subject matter of games on as basic and fundamental a level as possible, while still remaining very close to the object under investigation (ensuring the essentialist perspective), defining and arranging categories of the *game matter*, translating the findings, obtained through a *formal analysis*, into a *model* or *form* that is then labeled *ontology*.

We see from this short process of “doing ontology” that several formalisms are at play at once, including the method of formal analysis. It thus seems reasonable to criticize the terminological imprecision of formalism as it is presented in the game studies literature, as each type of formalism—along with methods of similar names—contributes with new and unique scientific approaches that alter the focus of the study in question. To work with game formalism is not simply to focus on the Aristotelian *form*, it may also be to explore the unique properties of said form, contrasting it or comparing it with other related objects (e.g., aesthetic artifacts), or to look into the *matter* on the lowest possible level of abstraction, attempting to uncover something meaningful about the *form* through this endeavor. Game formalism is not one particular “flavor” of formalism, but rather a variety of traditions through which the scholar may approach the empirical object. Therefore, we must be wary when using the term, both in relation to scholarly ideologies or approaches, and to scientific research methods.

Each of the three approaches identified offers different insights into games. As a final point of discussion, let us return to the example of *The Sims*. From the perspective of formalism as focused on the *aesthetic form* of the artifact under investigation, *The Sims* can be studied using a variety of formalist methods categorized as aesthetic formalist theories using Wolterstorff’s (1999) distinction. One could, for example, explore whether we can conceive of *The Sims* in terms of structural narrative and its core components, as studied in, for example, Propp’s (1928/2009) *Morphology of the Folktale* (to name a scholar of the Russian Formalist school). Conducting an analysis build on this theory, some of the significant differences between the traditional mediums for

storytelling and digital games would become apparent. We would likely find that *The Sims* does not adhere to traditional narrative structures, as it is not a story-driven game, but rather a dollhouse-simulation, whereas games like *Uncharted: Drake’s Fortune* (Naughty Dog, 2007) or *The Witcher 3: Wild Hunt* (CD Projekt Red, 2015) may resemble the structures outlined in Propp’s work to a much higher degree, as these are more centered on conveying a pre-scripted story to the player. As such, studies rooted in aesthetic formalist theories may ultimately contribute to our understanding of the essence of games, as they can help us point out how they are different from other types of media. This brings us to the discussion on the *essentialist* approach to formalism.

As I have argued, based on the discussion on Aristotle’s conceptualization of material and formal causes, it is challenging to suggest a definition of the essence of *The Sims* without relying on a definition of games and digital games, and without exploring the example in depth. The analysis model suggested by Consalvo and Dutton (2006), operating through the four categories of *object inventory*, *interface study*, *interaction map*, and *gameplay log*, approaches something which resembles an ontology, but they never define exactly what constitutes the essence of the game or of games in general. The much-debated definitions of games can be seen as indicators of why this type of formalism is problematic—a definition will always relate to the research agenda of the individual scholar, the disciplinary background of the scholar, and many related factors. Thus, the task of the game essentialist is to skillfully navigate these various approaches, make explicit the need for new insights, and explore how new ontologies, definitions, and the like contribute meaningfully to the field and to the study of game-ness.

Finally, formalism as a level of abstraction can be understood in relation to the generation of ontologies, but also as a way of approaching the specific analysis of a game through that which Lankoski and Björk (2015) refer to as *formal analysis*. They illustrate how formalism in this sense translates into the study of the structural components of the specific game analysed, which in turn becomes an analysis centered on the content, resembling the method of content analysis. For *The Sims*, this is exactly the type of analysis that is conducted by Consalvo and Dutton (2006) on the various items that can be obtained in the game, which are categorized based on the types of encounters they afford. While the content analysis of Consalvo and Dutton’s study appears meaningful in context, this way of approaching games may not always be equally useful, and for some games it may be an unnecessarily cumbersome task to describe all structural elements, putting into question the general applicability and value of this approach.

7. Conclusion

This article has explored different uses of *formalism* and *formal analysis* in the study of digital games. Based on

this exploration, I suggest we distinguish between three different types of formalism: 1) formalism focused on the *aesthetic form* of the game artifact, 2) formalism as *game essentialism*, and 3) formalism as a *level of abstraction*, which can be combined in various ways, but which should be maintained conceptually distinct in order to understand their basic nature and influence on the research in which they are incorporated. In the light of the narratology-ludology debate, I suggest we understand ludology as formalist in the sense that it builds on the idea that games have unique properties worth studying (an essentialist approach). Narratology, on the other hand, can also be understood as formalist, but in a general aesthetic tradition, where models developed for other types of storytelling media are superimposed on the study of games, focusing on the *narrativeness* of games, rather than the *gameness*.

To account for the *gameness* of games, various scholars work with the (computer science specific) concept of *ontology*, through which they attempt to map the basic components of games. Such ontologies can be used in formal analyses, relating to formalism as a level of abstraction, in which the focus is on the content or matter rather than the form, the latter of which is made central through the use of an ontology. Thus, formal analysis, when considered from the perspective of Aristotle's distinction between form and matter, should perhaps be called *material analysis*, as it depends on other formalist works to form the basic categories into which game content is categorized and listed.

Conflict of Interests

The author declares no conflict of interests.

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