"HOW DOES GAMIFIED INTERACTION ALLOW PARTICIPANTS TO CO-CREATE DIGITAL ARTWORKS?"

Qualitative analysis: comparative method, within-case method of analysis and embedded multiple-case study

Master Thesis

Handed in to

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ABSTRACT

Topic: Game design elements (gamification affordances) applied to interaction for co-creation in art.

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Content: So far gamification and interaction in art have been studied separately. However, the research question of this study "How does Gamified Interaction allow participants to co-create digital artworks?" covers three disciplines, respectively games, human computer interaction and interactive art and demonstrate connections premises between the three. Therefore, this study aims to bridge these three disciplines by filling the gap in the current research about the application of game design elements (gamification affordances) to interaction for co-creation in art.

In order to do so, the study conducts an in-depth cross-case and within-case qualitative analysis of four digital artworks, respectively The Beast, Cow Clicker, Tweetris and BURP in regards to two previously elaborated hypotheses, which goals are to provide evidence of a causal relationship (H1) and to eliminate a causal factor as a necessary condition (H2).

The results demonstrate that Gamified Interaction enables co-creation in the form of authorial and social collaboration, and that it does not necessary have to be designed according to the participants. These findings, as they can be replicated to a larger population of similar cases, generate new knowledge and content to the broader contexts of games, human computer interaction and interactive art, in which this study operates.

Declaration of authorship
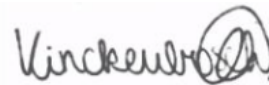
I, Dominique Vinckenbosch

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Table of content

Foreword

This master thesis goes beyond the frame of research as part of academia. It represents the consecration of seven years of study. Therefore as a whole this thesis is both the reflection and the sum of the countries I traveled to, the universities I attended and the people I met along the way.

The writing of this master thesis helped me to gain significant knowledge of the matter. It also taught me that hard times are temporary and that painful experiences can turn into positive outcomes.

As I am proud of the work that is done, I am also acknowledging the many privileges that I benefit from and that enable me to be where I stand today. May academia be more inclusive and diverse in the near future, so education can truly be democratic.

Credits

First and foremost, I am very grateful to the Erasmus Mundus program and the Media Arts Cultures consortium of universities for giving me the opportunity to expand my area of interests and grow in a multicultural environment.

Moreover, to my supervisor Palle, thank you for paying attention, listening and caring. This master thesis is evidence that an understanding and personal approach in academia will bring students much further than any rigid organization ever would.

I must also acknowledge my family and friends that constitute a strong and reliable support system built over the years. They were there when I thought I would not make it and are still there now that it is time to celebrate.

Last but not least, I express gratitude to anybody who contributed from one way or another to this research study.

Glossary

Gamification — the use of game design elements in non-game contexts (Deterding, Dixon, Khaled & Nacke, 2011, p. 5).

Gamified/gamifying — the practical application of game design elements to entities. This process is the result of a deliberate intention from the designer and its final result is experienced by the audience is if they were 'playing a game' with it (Deterding, 2012).

Gamified Interaction — the deliberate application of game design elements to interaction (or interaction-passing reaction or tricked interaction) taking place between two parties (respectively a human audience and the other one being of digital nature), and from which will result an artwork-event. The implementation process is made according to the audience's personal expectations of a successful interaction (art) experience (by the author, 2019).

Ludic space learning — (Kolb & Kolb, 2010, as cited in Nicholson, 2012b) see *magic circle*

Magic circle — diegetic space separated from real life, delimited by the constraints and the rules of the game, where time is stretchable and actions re-signified. Its exploration enables meaning-making (Huizinga, 1938; Waern, 2012; Zimmerman, 2003).

Possibility space — (Bogost, 2008) see *magic circle*

Procedural rhetoric — games study approach believing that games bear real world arguments in their mechanics and processes, which the participant can read and learn from by exploring the magic circle (Bogost, 2008).

TINAG — rhetoric used in immersive games that consists of denying the very nature of the game and blurring the frontier between real life and game world through different techniques to maximize the immersive effect (McGonigal, 2003b).

Wizard's curtain — in-game tacit social contract between participants and artist designers of immersive games. Participants perform belief to maintain the TINAG rhetoric and therefore do not look for how the game is made, while puppetmasters deliver a coherent immersive game experience to the participants according to the TINAG rhetoric (Hook, 2016).

List of Abbreviations

ARG	Alternate Reality Game
BLAP	Badges, Levels/Leaderboards, Achievements and Points
BOINC	Berkeley Open Infrastructure for Network Computing
BURP	Big and Ugly Rendering Project
GWAP	Game With A Purpose
MMORPG	Massively Multiplayer Online Role-Playing Games
PR	Procedural Rhetoric
PR Game	Procedural Rhetoric Game
TINAG rhetoric	'This Is Not A Game' rhetoric
VCP	Volunteer Computing Project

WBI   Whole-Body Interaction

INTRODUCTION

These past few years have witnessed the burst of the gamification trend, which makes every thing, process and service in any domain look like a game in order to gain, retain and improve public's engagement (Darch & Carusi, 2010). The art world makes no exception to this tendency, as "all art derives from play" (Huizinga, 1938, as cited in Flanagan, 2009, p. 8). Even though interaction may take place without any digital technologies being involved, paramount connectedness and multidisciplinary collaboration adds a novel immersive dimension to it, as well as it increases availability and accessibility in terms of resources (Edmonds, 2014).

However, as the literature review of this study reveals, so far gamification and interaction in art have been studied separately, although the research question of this study "How does Gamified Interaction allow participants to co-create digital artworks?" covering the disciplines of games, human computer interaction and interactive art make visible connections premises between the three. Therefore, this study aims to bridge these three disciplines by filling the gap in the current research about the application of game design elements (gamification affordances) to interaction for co-creation in art.

First the study comes up with a unique definition of Gamified Interaction: the deliberate application of game design elements to interaction (or interaction-passing reaction or tricked interaction) taking place between two parties (respectively a human audience and the other one being of digital nature), and from which will result an artwork-event. The implementation process is made according to the audience's personal expectations of a successful interaction (art) experience. Upon this, two hypotheses are formulated, respectively H1: "'Playing a game' (as the audience perceives Gamified Interaction) fosters co-creation in an artwork-event" with the research goal of "providing evidence of a causal relationship", and H2: "Participant-centered approach in Gamified Interaction is a necessary condition to the occurrence of

a gamified artwork-event" with the research goal of "eliminating a causal factor as a necessary condition".

Next the study chooses to conduct a qualitative analysis, using the most-different case typology (similar to the method of agreement) as the comparative method for the cross-case analysis, coupled with the method of process tracing as the within-case method of analysis, the whole taking the form of an explanatory embedded multiple-case study. The four cases namely The Beast, Cow Clicker, Tweetris and BURP used in the analysis are most-different and exploratory.

CHAPTER 1 : BACKGROUND OF THE STUDY

In the current context of thriving gamification and increasing digitalization of interaction, the subject of Gamified Interaction that this study investigates through the research question "How does Gamified Interaction allow participants to co-create digital artworks?" appears to be particularly topical and relevant.

The research question of this study encompasses three great disciplines, respectively games, human computer interaction (HCI) and interactive art. The following literature review stands as a theory framework to guide the study, discussing the previous works dealing with the topic as well as their results, confronting the different perspectives and arguments around it, and initiating connections between the three disciplines.

1.1. Games

As per the word itself, gamification comes from games. For a long time, games were considered a mere entertainment and did not gain a lot of attention from research. However, games nowadays have been elevated to the rank of art and the study of games has become a field of its own right, with many scholars and theorists proving that it goes beyond entertainment and that it can be used as a starting point or a comprehensive tool for interdisciplinary research and experimentations (Flanagan, 2009; Vinckenbosch, 2017).

1.1.1 Play

To understand games, one first needs to understand play, as it is the very broad category that contains various kinds of games (Deterding, Dixon, Khaled & Nacke, 2011). The act of play has always existed, way before the creation of digital platforms or board games; "Play is the function of the living" (Huizinga, 1938, p. 7). For this reason, many prominent theorists of the 20th century started researching play and its imbrications with real life. Historically there have been two schools of understanding for play: perceived as

voluntary, intrinsic, and important to class structure (leisure) and socialization (Brian Sutton-Smith, Johan Huizinga and Roger Caillois, said 'the idealizers') and play studied as ritual, communication and in natural settings (Gregory Bateson, Victor Turner and Brian Sutton-Smith) (Flanagan, 2009).

As this study investigates Gamified Interaction, it will focus on the first school of play that considers it as leisure and socialization. Caillois distinguishes two types of play activities (2001, as cited in Deterding, Dixon, Khaled & Nacke, 2011): paida, which is a free and spontaneous playing activity and ludus, which means gaming, as play structured by rules, goals and competition. Though, Sutton-Smith does not make a distinction in categories for playing as it can be many things: exchanges of power or 'power plays' (prioritize competition), bonding and belonging, a practice of real-life functions, or just 'fun' and choosing freely. To Sutton-Smith, play is voluntary, intrinsically motivated, it incorporates free choices/free will, it offers escape, and it is fundamentally exciting (as cited in Flanagan, 2009).

Huizinga (1938), complements this definition by emphasizing the importance of rules with the concept of the magic circle, a possibility space (Bogost, 2008) created by freely accepted rules, with its own time, repeatable and limitless (Zimmerman, 2003) where the activity of play occurs apart from ordinary life. As this world is separated from everyday life, the actions undertaken in the magic circle are re-signified, which means that they have a different meaning for the ones playing than for the people who see them play from outside of the circle (tab. 1) (Waern, 2012). Playing is thus the exploration of this new world made possible by the rules and in this very exploration resides meaning for the player (Bogost, 2008; Nicholson, 2012b).

	Is re-signified	Is paratelic & re-signified	Is paratelic	Is neither
Has rules	Role-play as therapy	Sandbox games, transgressive play	Gaver's 'ludic engagement', Couple dancing	Traffic
Has rules & goals	Role-play as therapy	GAME	Sport, Bureaucracy	Sport, Court process
Has goals	?	Alternate Reality Games	Paragliding	War
Has neither	?	Monkeys playing	Free dancing	

Table 1. Games and bordering phenomena. Reprinted from "Framing Games", by A. Waern, 2012, *DIGRA Nordic 2012 Conference: Local and Global – Games in Culture and Society*, p. 22.

Laslty, Mary Flanagan (2009) points out the relation between play and art, as some games became popular art forms and cultural references. Reversely, Huizinga suggests that "all art derives from play" (1938 as cited in Flanagan, 2009, p. 8) and therefore participation is a form of play. Consequently, any art form that is participative or interactive is based on play, which also means that play belongs to art (Flanagan, 2009).

1.1.2 Gamification

Although the current literature about gamification often refers to digital technology, the term can be used outside of it (Deterding, Dixon, Khaled & Nacke, 2011) as the definition is not limited to digital artifacts: "gamification is the use of design elements characteristic to games in non-game contexts" (Deterding, Dixon, Khaled & Nacke, 2011, p. 5).

Even though playfulness and gamefulness are complementary, they remain distinct. Gamification relates to games (ludus) inside the broad category of play (paida), which is play structured by rules, goals and competition (Caillois, 2001, as cited in Deterding, Dixon, Khaled & Nacke, 2011). Gamification is used to increase motivation/engagement of the participants in an activity or a

behavior as well as to increase or change a given behavior (Deterding, 2012; Morschheuser, Hamari, Koivisto & Maedche, 2017; Morschheuser, Werder, Hamari & Abe, 2017). According to Juho Hamari, the role of gamification is twofold: it is social (inviting, sharing) and motivational (through the use of game design elements) (2014, as cited in Andro & Saleh, 2015).

Gamification covers three key aspects: the design (gamification affordances), the psychological outcomes of gamification and the behavioral outcomes of gamification (Huotari & Hamari, 2016, as cited in Morschheuser, Hamari, Koivisto & Maedche, 2017). On one hand, reward-based gamification using extrinsic motivation such as badges, levels/leaderboards, achievements and points (BLAP) has proven to be effective for short-term goals. Though Scott Nicholson notes that reward systems only work as long as the rewards keep coming. Once the reward stops, the behavior stops (Nicholson, 2012a). In addition, rewards can be perceived as a controlling tool by the participants, which will also make the behavior stops (Nicholson, 2012b).

On the other hand, meaningful gamification is required for long-term change. To achieve it, participants must look at intrinsic motivations that are linked to the concepts of mastery, autonomy and relatedness (Rajat Paharia, 2012, as cited in Deterding, 2012; Deci & Ryan, 2004, as cited in Nicholson, 2012a). The gamification affordances must be designed so it creates a space where participants can have fun, learn, explore, have physical and emotional contacts with the activity, generate their own goals, make choices, customize the own elements of the game, be co-creators of the activity and be part of a community they can share with.

To conclude, both extrinsic rewards to get quick tasks done and intrinsic rewards for long-term change can be successful, depending of the pre-set objectives of gamification (Nicholson, 2012a). Though in order for gamification to be meaningful, it must be user-centered and include game design elements (Elizabeth Lawley, 2012, as cited in Deterding, 2012; Morschheuser, Werder, Hamari & Abe, 2017). Since both kinds of gamification (BLAP and intrinsic) are based on games, which belong to play, and require at least a minimal

degree of interaction, any of their productions can thus be considered an art form (Flanagan, 2009).

1.1.3 Gamified/gamifying

Now that the literature about gamification has been reviewed, the study can focus on what has been written about gamifying, which in other words is the practical application of gamification affordances (game design elements) to entities. First, it comes out of the current literature that the term 'gamified' is often associated with a negative connotation due to its use as a buzzword for marketing and other business-related purposes (Deterding, Dixon, Khaled & Nacke, 2011) in health, education, task management, sustainability, user-generated contents programs, etc. (Deterding, 2012). It seems that gamifying got a bad reputation because it is usually profit- and performance-oriented.

Therefore, the first step for making the act of gamifying successful is thus to follow the same recommendations that apply to meaningful gamification as explained right above. Moreover in gamifying, the most important part is the implementation of game design elements (gamification affordances) (Huotari & Hamari, 2016, as cited in Morschheuser, Hamari, Koivisto & Maedche, 2017) (tab. 2). Gamified entities are systems that are built with the intention from the designer to include only some elements from game design (examples of these in the last column of tab. 2); therefore, gamified entities are not full "games proper". Though, from the user perspective, these gamified entities as systems borrowing from games can be experienced and enacted just like proper games thanks to the versatility of the modes of engagement: gameful, playful, and instrumental (Deterding, 2012).

Therefore, what distinguishes gamified entities from any other games-related productions (serious games, full-fledged games, pervasive games, simulation, etc.) is the intention of the designer to apply some game design elements to it and the users' experience of playing a game with it (Deterding, 2012). Some researchers even argue that games themselves can be gamified (Hamari & Eranti, 2011, as cited in Deterding, Dixon, Khaled & Nacke, 2011).

Level	Description	Example
Game interface design patterns	Common, successful interaction design components and design solutions for a known problem in a context, including prototypical implementations	Badge, leaderboard, level
Game design patterns and mechanics	Commonly reoccurring parts of the design of a game that concern gameplay	Time constraint, limited resources, turns
Game design principles and heuristics	Evaluative guidelines to approach a design problem or analyze a given design solution	Enduring play, clear goals, variety of game styles
Game models	Conceptual models of the components of games or game experience	MDA; challenge, fantasy, curiosity; game design atoms; CEGE
Game design methods	Game design-specific practices and processes	Playtesting, playcentric design, value conscious game design

Table 2. Levels of game design elements. Reprinted from "From Game Design Elements to Gamefulness: Defining 'Gamification'", by S. Deterding, D. Dixon, R. Khaled, L. Nacke, 2011, *The 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, p. 4.

1.1.4 Categorization

To wrap up this section about games and move on to the next about HCI, it may be useful to try and situate all forms of games and games-related activities mentioned in this literature review in order to have a comprehensive overview of the different fields and the connections between them. To do so, this study will use the extensive chart made by Sebastian Deterding, Dan Dixon, Rilla Khaled and Lennart Nacke (2011) as a base and complete it (fig. 2).

For the past three decades, video games have been recognized as a cultural and experiential medium, elevated to the rank of art just like films or literature. The characteristics and components of video games have impregnated nowadays society with playful behaviors and uses that led to a 'ludification of culture' (Montola, Stenros & Waern, 2009, as cited in Deterding, Dixon, Khaled & Nacke, 2011). Besides, since ludification of culture is based on play,

and that play belongs to art (Flanagan, 2009), all games-related activities introduced in the following figure (fig. 2) can be considered art works.

As mentioned before, play as paida (free and spontaneous act of playing) encompasses games as ludus (rules, mechanisms, competition, goals) and at the intersection of both can be found casual games and board games. Casual games have simple instructions, do not require any special skills or knowledge to be played and can be played within a small amount of time. These games reach a broad audience and can be played at anytime of the day and be squeezed between daily responsibilities (Cusack, Martens & Mutreja, 2006).

Further in layering off are three main categories: the extension of games, the 'use of games in non-game contexts' and playful interaction. Within the 'use of games in non-game contexts', on one hand there is serious games (i.e. full-fledged games) and on the other hand, the 'use of games components'. The concept of serious games has been proposed for the first time in 1999 by Sherry Ortner to describe games for serious purposes (mainly in military works at that time) (Malaby, 2007). The term then evolved to become a field of research of its own in the years 2000 and designates full-fledged games for non-entertainment purposes such as education, training or persuasion (Deterding, Dixon, Khaled & Nacke, 2011; Deterding, 2012). Ute Ritterfeld, Michael Cody and Peter Vorderer go further and add that digital serious games are "any form of interactive computer-based game software (...)" (2009, as cited in Deterding, Dixon, Khaled & Nacke, 2011, p. 2).

Serious games thus educate the players on specific topics. The section also contains amongst others critical games that include procedural, abusive and subversive games. Procedural rhetoric games (PR games) allegedly bear representations and models of the real world in their processes and mechanics, which can be understood by playing the game and later used in the player's real life (Dugan, 2006, as cited in Bogost, 2008). Therefore these games produce meaning as the player plays them (Bogost, 2008). The serious games section also encompasses 'games with a purpose' (GWAPs)

or otherwise called human-based computation games. This movement started with Luis von Ahn's concept of human computation in 2005, which is an effort of 'connected joint human intelligence' through games in order to solve cases that computers cannot solve yet or that can only be solved by groups of humans (Quinn, 2011, as cited in Andro & Saleh, 2015).[1] GWAPs also use gamification (Andro & Saleh, 2015). Finally, further in serious games can be encountered pervasive games, which blur the line between game-world and reality. Though this type of games is not fully immersive as their gameness shows with no effort to hide it, and they heavily rely on other technologies, which creates a physical separation with real life (McGonigal, 2003a; McGonigal, 2003b).

Still in the category of 'using games in non-games contexts', the other section 'games components' can itself be differentiated into three divisions: game technology, game practices and gamification (Deterding, Dixon, Khaled & Nacke, 2011). As previously explained in this study, 'gamified/gamifying' is the implementation of game design elements (gamification affordances) to entities. It stands next to gamification while gamification used with extrinsic rewards belongs to ludus.

Finally, apart from the category of 'using games in non-game contexts' stands the category of extension of games with immersive games, augmented reality games, alternate reality games (ARGs) and location-based games. In immersive games, as the name suggests, immersion is greater than in pervasive games because the game is taking place offline and online and real life elements are used as components of the game, which erases all form of metacommunication (McGonigal, 2003a; McGonigal, 2003b). Regarding ARGs, they are a genre of immersive games and their specificity is that they deny to be a game, following the 'This Is Not A Game' (TINAG) rhetoric, rather than sticking to standard game paradigms (Fallon & Darvasi, 2017; Szulborski, 2005).

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[1] von Ahn is a pioneer and leader in GWAPs with creations such as reCAPTCHA (2007), ESP

The last category is playful interaction that encompasses playful design and toys. Serious games, gamification, playful design and toys can also be differentiated from the dimensions of whole/part and playing/gaming (fig. 1).
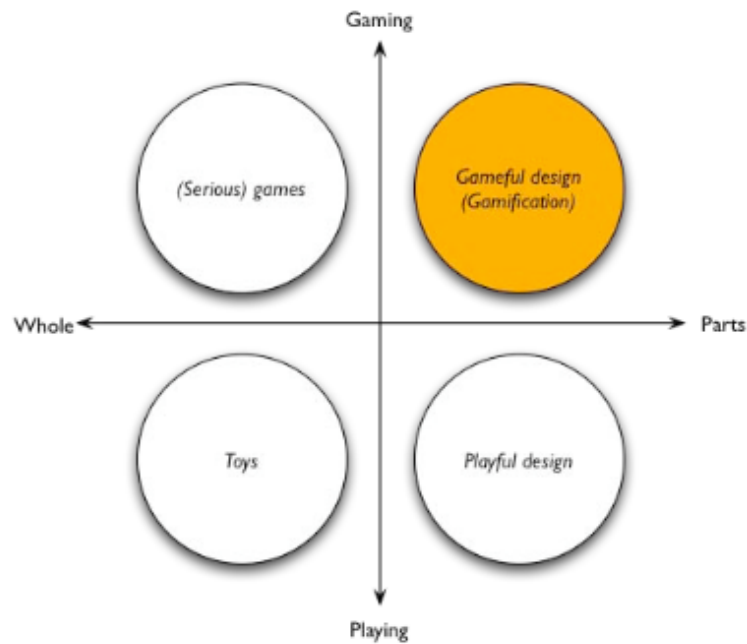
Figure 1. Between game and play, whole and parts. Reprinted from "From Game Design Elements to Gamefulness: Defining 'Gamification'", by S. Deterding, D. Dixon, R. Khaled, L. Nacke, 2011, *The 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, p. 5.

HCI
- **VCPs**
  - **Crowdsourcing**
  - **Participatory Science**
  - **Distributed Intelligence**
  - **Extreme Citizen Science**

USING GAMES IN NON-GAME CONTEXTS

GAMES = LUDUS

SERIOUS GAMES
= full-fledged games

- **Critical Games**
  - **Procedural**
  - **Abusive**
  - **Subversive**

- **GWAPs**

- **Simulation training games**

- **Pervasive games**

GAMES' COMPONENTS

GAME TECH

GAME PRACTICES

GAME DESIGN

= GAMIFICATION

GAMIFYING

Intrinsic rewards (long term)

Extrinsic rewards (short term)
= BLAP = GAMES - PLAY

- **Casual Games**

- **Board Games**

SERIOUS PERVASIVE GAMES

- **Immersive Games**

- **Alternate Reality Games**

- **Augmented Reality Games**

- **Location-Based Games**

EXTENSION OF GAMES

- **Playful Design**

- **(Serious) Toys**

PLAYFUL INTERACTION

PLAY = PAIDA

LUDIFICATION OF CULTURE

Figure 2. Situating games in the larger field. Based partly on "From Game Design Elements to Gamefulness: Defining 'Gamification'", by S. Deterding, D. Dixon, R. Khaled, L. Nacke, 2011, *The 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, p. 5.
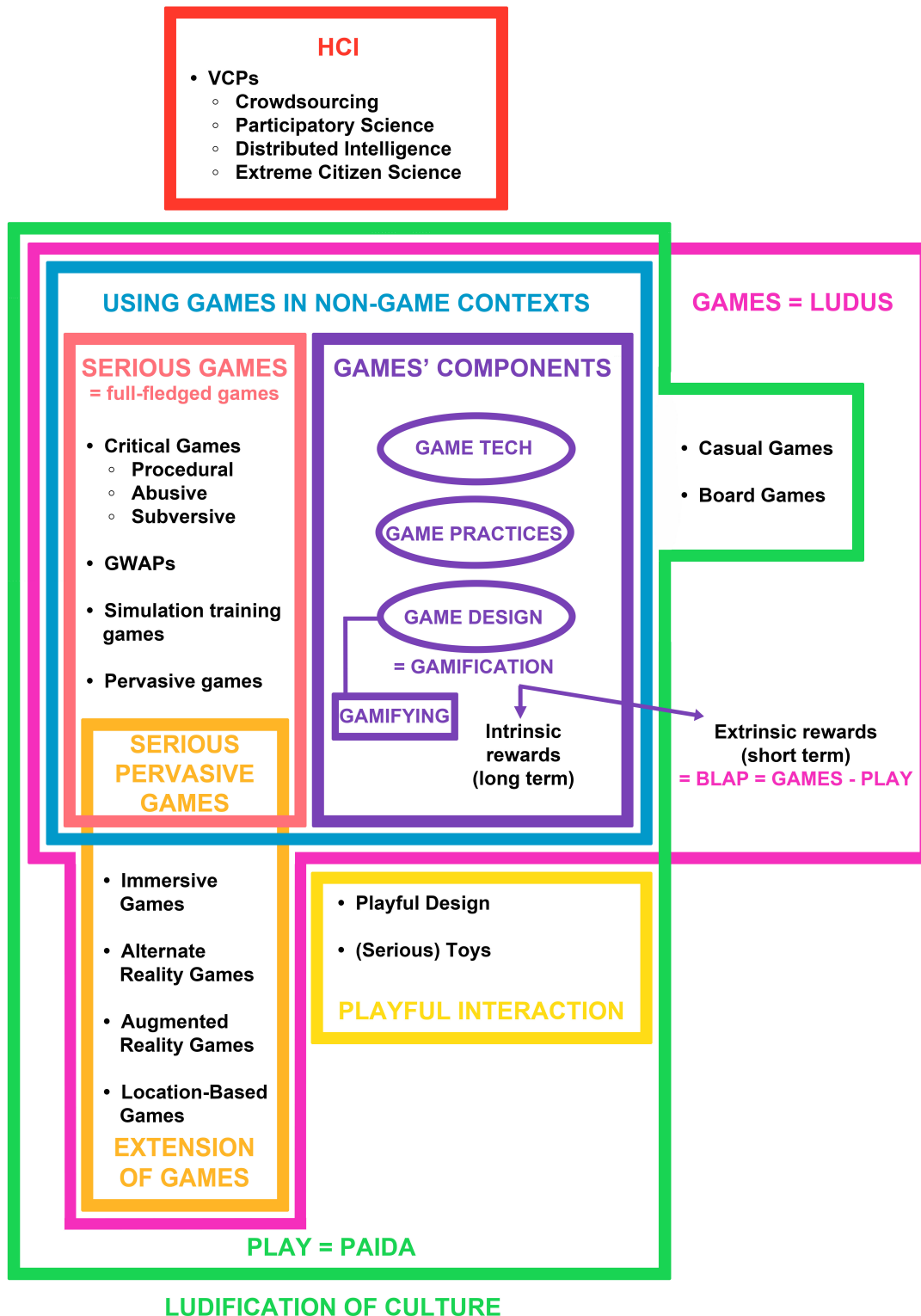
1.2. Human computer interaction

Simultaneously to the emergence of serious games, arose the field of HCI (Deterding, Dixon, Khaled & Nacke, 2011). It researches interaction between people and machines. Therefore, there is a strong link between HCI and engagement and how to improve the quality of experience and interaction between both entities through design. To do so, Ernest Edmonds (2014) suggests that the experience design must be user-centered and allow people to get involved in the design process.

Within the field of HCI emerged volunteer computing projects (VCPs), also labeled citizen participation projects/citizen science projects, which are set up by experts/scientists and for which citizen volunteer to donate their personal computers' spare capacity for computing projects that require a lot of energy, tasks that cannot yet be done by computers so they are outsourced to people or tasks that can only be solved by limited groups of people (Quinn, 2011, as cited in Andro & Saleh, 2015; Aristeidou, Scanlon & Sharples, 2017; Darch & Carusi, 2012; von Ahn, 2009, as cited in Morschheuser, Hamari, Koivisto & Maedche, 2017). Such kind of projects is directly depending on citizens' engagement and contribution, two behaviors that HCI can improve through design elements and user-centered approach (Aristeidou, Scanlon & Sharples, 2017). The goal of such projects can be twofold: to acquire significant computing capacity and/or to educate people about science (Darch & Carusi, 2012).[2]

On one hand, Rick Bonney et al. (2009, as cited in Aristeidou, Scanlon & Sharples, 2017) propose to categorize VCPs according to the level of collaboration between citizens and experts, which leads to projects being contributory, collaborative or co-created. On the other hand Muki Haklay (2013, as cited in Aristeidou, Scanlon & Sharples, 2017) suggests a typology focused on the level of citizens' participation and engagement, respectively:

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[2] Some examples of VCPs: Galaxy Zoo (Zooniverse, 2007), OpenStreet map (Steve Coast, 2004), SETI@home (University of California Berkeley, 1999), Rosetta@home (University of Washington, 2010), Climateprediction.net (Oxford University, 2002)

crowdsourcing, participatory science, distributed intelligence/human computation and extreme citizen science.

Another typology is the one proposed by Benedikt Morschheuser, Juho Hamari, Jonna Koivisto and Alexander Maedche (2017), which focuses on online volunteering at large, not only for science-driven VCPs. They present the category of 'crowdsourcing' that they further differentiate in four types: crowdprocessing,[3] which refers to the use of a crowd to perform important and homogeneous tasks, crowdsolving,[4] which is using the variety of the crowd to find extensive solutions to a given complex problem, crowdrating,[5] which uses the crowd intelligence for collective predictions or assessments and crowdcreating,[6] which involves the crowd in the creation of artifacts on a variety of heterogeneous contributions (fig. 3). In addition, Mathieu Andro and Imad Saleh (2015) observe two different approaches to crowdsourcing: straightforward crowdsourcing where participants voluntarily get involved (i.e. Wikipedia) and implicit crowdsourcing that benefits from volunteers' work that they are not aware they are providing (i.e. CapTCHA).

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[3] Like Amazon Mechanical Turk (Amazon, 2005)
[4] For Instance FoldIt (University of Washington, 2008)
[5] Example with Clickworkers (NASA, 2000)
[6] Like Wikipedia (Wales & Sanger, 2001)
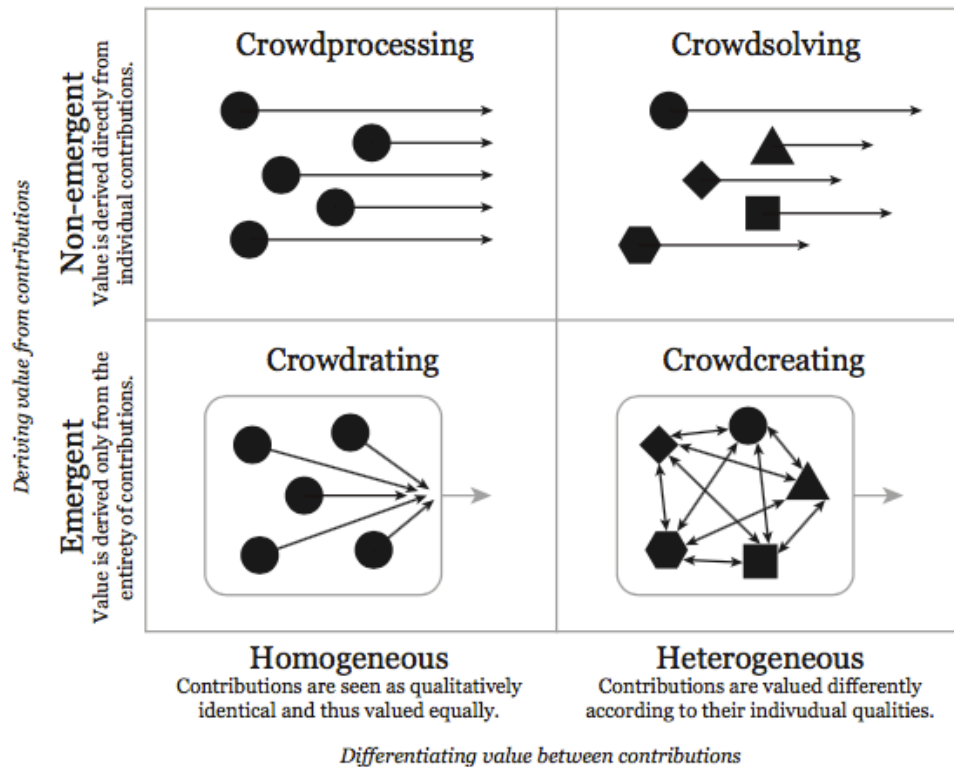
Figure 3. Four archetypes of crowdsourcing systems. Reprinted from "Gamified crowdsourcing: Conceptualization, literature review, and future agenda", by B. Morschheuser, J. Hamari, J. Koivisto, A. Maedche, 2017, *International Journal of Human-Computer Studies, 106*, p. 28.

1.3. Interactive art

1.3.1 Interactivity

According to João Tiago Maia de Araújo (2017) for a system to be interactive, it needs the gathering of input analysis and processing or otherwise the use of input and output of the result in a (1) mostly unpredictable, (2) creative and (3) valuable way. The three last characteristics are necessary conditions for the system to be considered as 'art' by the audience (Maia de Araújo, 2017).

An artist knows her artwork is interactive because she knows about its inner interactive design and mechanisms, yet the audience does not have that knowledge. The main way to guarantee that at least most people will acknowledge the work as interactive is by presenting objects that appear to be 'creative'. However, the participant is being creative already by engaging with the system so it will show results in the output (Maia de Araújo, 2017).

Maia de Araújo (2017) adds that an interactive system must also be reactive, which means to be able to receive and process input. Indeed, his study found that in the public perception, anything 'reactive' is (wrongfully) interactive. Therefore, while designing an interactive artwork, the designer should proceed with a user-centered approach and try to understand what do they consider being creative or interactive (Maia de Araújo, 2017). As a matter of fact, in interactive art the most important for artists is not how does the artwork look but how does the audience feel and experience it, as well as to which degree they engage with it (Edmonds, 2014).

Finally, Maia de Araújo (2017) suggests several tools to 'trick' a feeling of interactivity: to make publicity around the said interactive artwork, to make it a game, vague and puzzling input suggestion that may increase engagement, assumption of a complex system processing inputs, to avoid frustrations by setting a clear internal cause and effect, to settle the artwork in a favorable context (e.g. interactive artworks fair), dialogue to help the projection of intent and meaning in the system (Maia de Araújo, 2017).

1.3.2 History

Interaction has always been present in art, as to start with painting where the viewer's perceptual system is engaging with the artwork; the longer one observes an artwork, the more likely her perception of it will change. In that sense, audience engagement is part of the creative process of making the work complete (Edmonds, 2014). Indeed, interaction between audience and artworks has been triggered by different artistic techniques throughout the years in order to induce the active behavior of the viewer like horizontal Chinese scrolls, panorama paintings and trompe-l'oeil, then also in many other artistic disciplines through the development of color, composition and material (Li & van der Veer, 2018).

Later around 1950 interaction in art could be found in action art and environment art, two disciplines that invite the viewer to physically enter its space (Edmonds, 2014). In the sixties, participatory action art led to shaping interactive environments and welcomed performances and happenings

(Kluszczynski, 2013). These were new participatory forms with physical and direct participation of the audience to explicitly create the work. Therefore, art was already interactive before the era of digital technologies (Edmonds, 2014).

Next, between 1960-1970 appeared the art of electronic media with for instance cybernetic art, laser art, etc. (Kluszczynski, 2013). Technology has definitely facilitated the interaction between the audience and the artist's work (Edmonds, 2014). Finally, in addition to all types of interaction in art accumulated through history, nowadays people can use their five senses to interact with the artworks. Moreover, the artwork itself can react to stimulus created by the audience or the other way around (Li & van der Veer, 2018).

As aforementioned, art is increasingly multidisciplinary, mainly with the combination of technology and sciences, making the exploration of art more intuitive and reactive, as well as borderless. At the core of the collaboration between these fields is a methodology of participation or co-creation, which leads to symbiotic relationships between human beings and machines (Holt, 2015; Li & van der Veer, 2018). According to Danzhu Li and Gerrit van der Veer (2018), the development of these new relationships will create more diverse works and increase the number of participants taking part in them.

Although technology empowers artists, it also represents a challenge for them because nowadays anyone can be an artist thanks to new media (resources sharing, usability of interfaces and tools). At the same time, technology also blurs the boundaries with art (e.g. through in-depth learning and powerful algorithms, artificial intelligence systems are able to understand art and could even replace artists) (Li & van der Veer, 2018).

1.3.3 Interactive art: characteristics

Ryszard Kluszczynski (2013) argues that interactive art is multidimensional and shaped by five artistic fields, interconnected but different: kinetic art, art of action, installation art, art of electronic media and conceptual art. As interactive art takes its roots in each, it thus has characteristics of all of them.

As for the implementation of interactive art, Kluszczynski (2010) proposes eight strategies, including the most relevant for this study: strategies of instrument, game, network and spectacle. Artworks can refer to several strategies at the same time and a merging of different strategies can happen, especially because of the hybrid character of contemporary interactive art.

Moreover, in interactive art the artwork is not final, rather it is an event where the audience can take part in activities through interaction. Only with the audience's participation is the artwork-event final. Besides, interactive art is fundamentally conceptual because it problematizes some aspects of the art, it rejects the object-like character of the artwork and replaces it with participative forms and because the material is not the final work, it is a context for intellectual reflection and creation for the viewers (Kluszczynski, 2013).

Further in interactive art, Jun Hu et al. (2013) differentiate four forms of participative art, according to the material, interactivity and technology. With 'static forms' there is no interaction between the artwork and the viewer and no reaction from the artwork to its context or environment. Second comes 'dynamic forms', where artworks can transform autonomously or in reaction to external stimulus. In this phase the audience is still a passive observer. Third comes 'interactive forms' where the audience has a direct influence on the artwork and the interaction is a dialogue. Finally, in 'participatory art' the artwork is not final, it acts as an interactive platform for collaboration between people and disciplines, up to the creation of an artifact that can grow over time and over distance (thanks to connectivity and interface technologies). The artwork reacts and adapts to the social environment it is embedded in. Therefore, in participatory art the artist needs to anticipate the future contribution (actions and creativity) of the audience. Participatory media forms are mostly seen in contexts that allow a high degree of user-contributed content (like online applications) (Hu et al., 2013), attempting to shift the aesthetic experience to a socially engaged practice (Holt, 2015).

CHAPTER 2 : DEFINING THE SCOPE OF THE STUDY

2.1. Gamified interaction: definition

While the literature review has covered the three disciplines related to the research question (games, HCI, interactive art), it has also unveiled the premise of a definition for Gamified Interaction. However, before trying to come up with a unique definition for this concept, it should be reminded once again that this study exclusively focuses on Gamified Interaction within the realms of digital Technology and art, even though it could also take place outside of them.

As mentioned in the literature review, gamified comes from gamification, which is "the use of design elements characteristic for Games in non-game contexts" (Deterding, Dixon, Khaled & Nacke, 2011, p. 5). Gamifying thus is the application of gamification affordances (game design elements) to entities. During this process, the designer can choose to maximize the experience of the audience to the gamified entity and therefore to personalize it with a user-centered approach (Morschheuser, Werder, Hamari & Abe, 2017). As this whole implementation process results from the deliberate actions of a designer's intentions, Gamified entities in their architecture clearly differ from other games productions. However, looking at the audience's reception of the production, they may not perceive the difference as gamified entities also allow interaction (Deterding, 2012).

Regarding interaction, on one hand the literature review investigates HCI (which studies the interaction between people and machines), focusing on the case of VCPs. It comes out that there is a strong link between HCI and the notions of engagement/motivation. In that very context, it appears that Interaction itself is a co-created/co-operated mechanism with varying degrees of involvement that can be increased through design elements and a user-centered approach, in order once again to maximize the audience's experience in the interaction with the machine (Aristeidou, Scanlon & Sharples, 2017; Edmonds, 2014).

On the other hand, the review of interactive art has revealed that the audience often mistakes reactivity for interactivity and that they will elevate a production to the rank of Art if the outcome is unexpected, creative and valuable. As these characteristics are subjective, interactivity in art must be user-centered (Maia de Araújo, 2017). One should also note that interactivity can be 'tricked' even when there is none and that what matters with interactivity in art is the experience the audience takes away from it (Maia de Araújo, 2017).

Moreover, in interactive art the production is an event, not an object and it is complete only with the contribution of the participant(s) (Kluszczynski, 2010). Consequently, interactive art is inherently participative (co-creative and contributory) and dependent on bigger contexts, which it adapts or reacts to (Hu et al., 2013).

Thereupon, the author's own unique definition of Gamified Interaction comprehended within the context of this study is as follows: T**he deliberate application of game design elements to interaction (or interaction-passing reaction or tricked interaction) taking place between two parties (respectively a human audience and the other one being of digital nature), and from which will result an artwork-event. The implementation process is made according to the audience's personal expectations of a successful interaction (art) experience** (fig. 4).
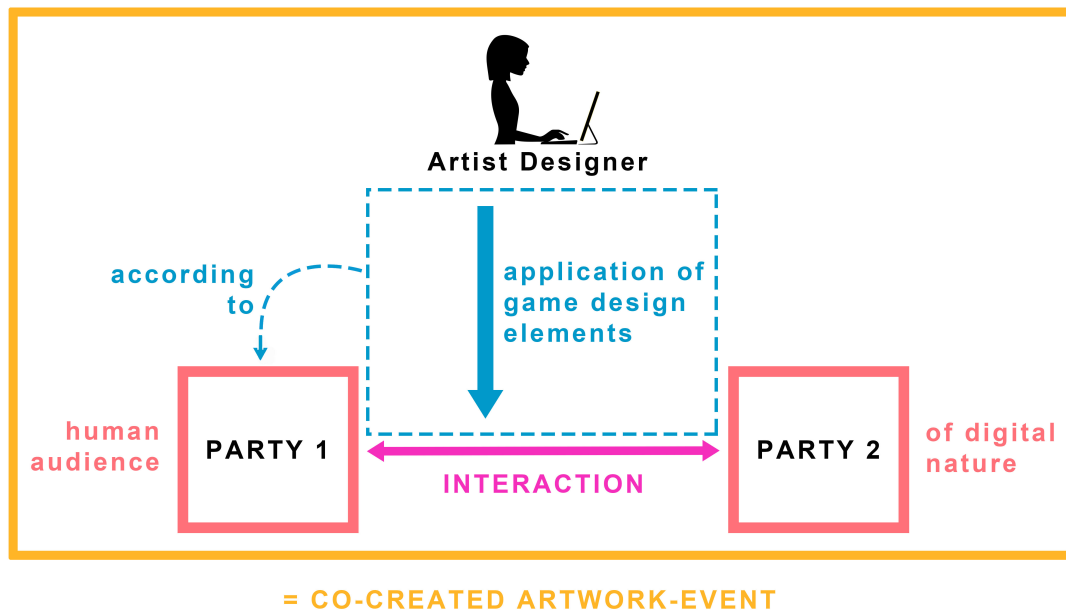
Figure 4. Gamified Interaction, by the author, 2019.

Female silhouette [Image] (WT, 2014). Retrieved from http://clipart-library.com/clipart/6Ty5X7Mac.htm

2.2. Hypotheses

Based both on the literature review discussing the theories related to the researched themes and on the researcher's academic training,[7] hypotheses can be formulated in order to make an educated guess to the possible outcomes of this study (Baxter & Jack, 2008). Hypotheses also work as a conceptual framework to guide the research (Baxter & Jack, 2008) and will be used to validate or invalidate the replication logic in the embedded multiple-case study taking place in the next chapters of this study (Yin, 1984).

As defined before, entities that are gamified only borrow some design elements from games, therefore they are not 'proper games'. However, as the participant does not have any upfront knowledge of the structure of these gamified entities, she confuses them with proper games and engages with them just like she would with any other games-related production. The audience believes that gamified entities are proper games, unless they are told otherwise (Deterding, 2012).

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[7] Analysis and Criticism of Computer Games, Critical Ludology. Semester 3 at City University of Hong Kong, as part of the EMJMD "Media Arts Cultures"

Yet, in the context of this study, the entity being gamified is Interaction itself. Therefore, if Gamified Interaction is replaced by 'playing a game' in its own unique definition, it presents as followed: "**'Playing a game'** between two parties (respectively a human audience and the other one being of digital nature) from which will result an artwork-event. (...)" (fig. 5).

H1: 'Playing a game' (as the audience perceives Gamified Interaction) fosters co-creation in an artwork-event.
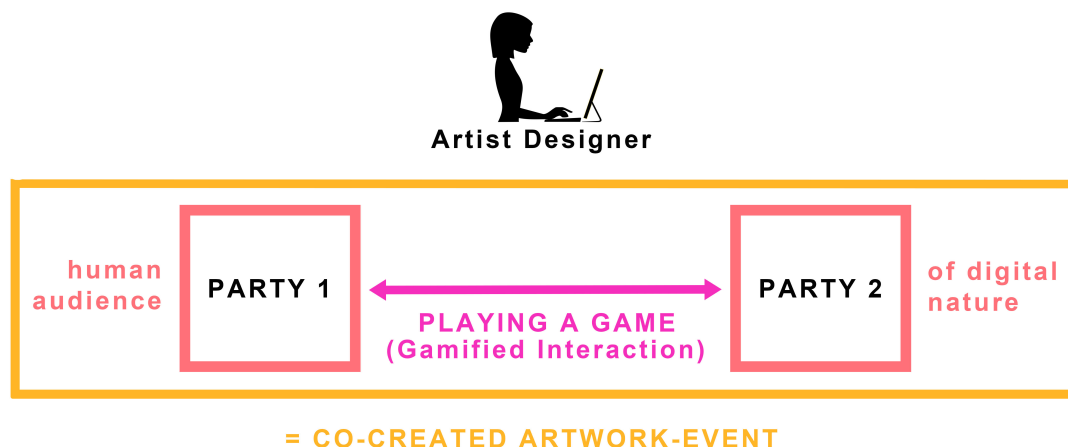
Figure 5. Gamified Interaction perceived as 'playing a game', by the author, 2019.

In gamification, as well as for gamifying, VCPs and interactivity in art, researchers unanimously recommend a user-centered approach in order to attract participants, to improve their engagement/contribution to the project, to create meaningful experiences and to better the quality of the interaction occurring (Aristeidou, Scanlon & Sharples, 2017; Baruch, May & Yu, 2016; Darch & Carusi, 2010; Edmonds, 2014; Maia de Araújo, 2017; Morschheuser, Werder, Hamari & Abe, 2017; Rose & Meyer, 2002, as cited in Nicholson, 2012b; Schamber, 1994, as cited in Nicholson, 2012b).

As Gamified Interaction derives from the three disciplines (games, HCI, interactive art) for which a user-centered approach is highly advised, it is assumed that the same recommendations apply to it. Consequently, Gamified

Interaction goes hand in hand with a participant-centered approach in the creation of an artwork-event.

H2: Participant-centered approach in Gamified Interaction is a necessary condition to the occurrence of a gamified artwork-event.

2.3. Goals of the research

This study will focus on testing hypotheses, rather than generating some. As a matter of fact, it will focus on comparable case research designs such as comparative methods and within-case methods of analysis (Gerring & Cojocaru, 2016; Levy, 2008).

The research question "How does Gamified Interaction allow participants to co-create digital artworks?" leads the study to an explanatory case study because it implies causal claims ('how') and also because the researcher cannot manipulate the behaviors of the contemporary events studied (Yin, 1984).

The goals of this research are twofold, as it posits two hypotheses to the research question. In regards to the first hypothesis:

H1: 'Playing a game' (X) fosters co-creation (Y) in an artwork-event.

The goal is to provide evidence of a causal relationship, where X is the causal factor of interest and Y is the outcome of interest (Seawright & Cojocaru, 2011). This goal is represented under the formula $X \rightarrow Y$ (Gerring & Cojocaru, 2016).

Regarding the second hypothesis:

H2: Participant-centered approach in Gamified Interaction (X) is a necessary condition to the occurrence of a gamified artwork-event (Y).

The goal is to attempt to eliminate a causal factor, where X is the necessary variable and Y is the outcome of interest. This goal is represented under the formula $\cancel{X} \rightarrow Y$ (Gerring & Cojocaru, 2016). As a matter of fact, Bennett (2004) states that if the hypothesized necessary variable X to the occurrence of Y can be shown to have been absent in even a single case in which the

outcome Y occurred, then it shows evidence that the variable X is not a necessary condition to the outcome Y.

2.4. Binding the case study

Robert Stake (1995) and Robert Yin (2003, both as cited in Baxter & Jack, 2008) recommend setting boundaries to the case study. This research follows the limitation by definition and context proposed by Matthew Miles and Michael Hubernam (1994, as cited in Baxter & Jack, 2008). The scope of this research is therefore limited to the aforementioned definition of Gamified Interaction, within the context of interactive digital artworks.

Even though this case study is about a single topic (being Gamified Interaction in regards to digital artworks), it involves several cases with different subunits of analysis (the two hypotheses formulated earlier). Thus this research paper will use an embedded multiple-case study research design (Yin, 1984).

CHAPTER 3 : METHODOLOGY

As it is the standard in the field of Humanities, this study chooses a qualitative approach over a quantitative one. Within this approach lies different methods that researchers often combine in order to increase the credibility of their study: comparative methods, within-case methods of analysis, case studies, statistical analysis and experimental methods (Lijphart, 1971, as cited in Collier, 1993). As the researcher does not have access to a sufficiently large set of data around the study topic, neither to first-hand experimentations, statistical analysis and experimental methods are thus ruled out, which leaves this study with comparative methods, within-case methods of analysis and case studies.

3.1. The case study

3.1.1 Case study advantages

A case study is the in-depth analysis (qualitative or quantitative) of one single case or a small number of cases in order to understand a broader population of similar cases (Gerring & Cojocaru, 2016; Gerring, 2004, 2007, as cited in Seawright & Gerring, 2008). Case study helps, amongst other advantages, to construct validity and to assess rival explanations, to test or generate hypotheses, to build new theories, to make inferences regarding causal mechanism, to show that a specific model/concept illuminates the case (parallel demonstration theory) or to highlight how different cases are (contrast of contexts) (Bennett, 2004; Lijphart, 1971, as cited in Collier, 1993). Donald Campbell even argues that the case study is the basis of most comparative research (1975, as cited in Collier, 1993).

3.1.2 Case study research designs

For a case study to be conducted efficiently, the researcher needs to fulfill several steps. Yin (1984) recommends that a case study research design first start with a research question. Indeed, the type of research question along

with the level of control over the events studied and if these events are current, will show if the case study is the right method to use.

If the case study has appeared to be one of the best fits for the research, the researcher then elaborates the propositions of the study (the hypotheses), which are the different angles of consideration to look at within the research question (Yin, 1984). Next, Stake (1995) and Yin (2003, both as cited in Baxter & Jack, 2008) recommend setting boundaries to the case, which can be done according to different ways: by time and place (Creswell, 2001, as cited in Baxter & Jack, 2008), by time and activity (Stake, 1995, as cited in Baxter & Jack, 2008) or by time and context (Miles & Hubernam, 1994, as cited in Baxter & Jack, 2008). At the same time, the researcher delimits the units of analysis of the study (the main topics that the research question tackles). If there is more than one unit of analysis, the case study is 'embedded' and if there is only one unit of analysis, it is 'holistic'. These three first steps narrow the scope of the study by setting limits to the data collection and analysis for the case study. All three are realized according to a prior literature review done by the researcher, that constitutes a theoretical framework for guidance and is a crucial element of the case study, which differentiates it from other types of research (Baxter & Jack, 2008; Yin, 1984).

In the data collection phase of the case study, Yin (1984) advises for a return to the initial propositions. To do so he mentions two strategies including Campbell's 'pattern matching' (1975) or linking the data to the propositions, then to establish criteria for interpreting the findings. On these two steps Yin does not give further explanations regarding their implementation, except suggesting that there is no precise way of realizing them. Stake (1995, as cited in Baxter & Jack, 2008) suggests two other analysis strategies: the categorical aggregation and the direct interpretation.

Finally, Yin concludes with the replication logic in the cases that along with the literature review previously made, would both enable the researcher to generalize the results of the Case Study (Baxter & Jack, 2008; Yin, 1984).

An alternative case study research design is proposed by Andrew Bennett (2004) under the 'research design tasks' that are common in statistical and comparative case(s) studies. His design suggests starting by defining the objectives of the research then the variables (the criteria) and eventually the cases to be studied.

3.1.3 Typologies of the case study

The literature about case study typologies is extensive and many different typologies have been created and revisited throughout the years. Therefore, in this study the researcher decides to present an overview of the main typologies existing for the case study, before choosing the best fit for this study in particular (tab. 3 & tab. 4).

Arend Lijphart was a pioneer in the comparative method and paved the way for publications and further researches on small N analysis (1971, as cited in Collier, 1993). Most typologies after Lijphart are variations or adaptations of his. Eckstein for instance refined Lijphart's previous typology and even though the two are in overall comparable, the denomination is distinctive (tab. 3).

Lijphart (1971)	Eckstein (1975)
Atheoretical case study	Configurative - idiographic case study
Interpretative case study	Disciplined - configurative case study
Hypothesis-generating case study	Heuristic case study
Theory confirming/infirming case study	Crucial, most-likely, least-likely case study
Deviant case analysis	/

Table 3. Equivalence of Lijphart's and Eckstein's typologies of the case study. Adapted from "Case Study Methods: Design Use and Comparative Advantages", by A. Bennett. D. F. Sprinz and Y. Wolinsky-Nahmias (Eds.),

Models, Numbers, and Cases: Methods for Studying International Relations (p. 22), 2004, Ann Arbor: University of Michigan Press.

Other methodologists have built on Lijphart's typology, such as Yin, Pamela Baxter and Susan Jack or Jack Levy, all revisiting Lijphart's classification or referencing other researchers' ideas (tab. 4).[8]

Yin (Gerring & Cojocaru, 2016; Yin, 1984)	Baxter and Jack (2008)	Levy (2008)
Exploratory case study (explore outcomes) Explanatory case study (explain presumed causal links) Descriptive case study (describe phenomenon)	Exploratory case study (Yin, 2003) Explanatory case study (Yin, 2003) Descriptive case study (Yin, 2003) Instrumental case study (Stake, 1985) Intrinsic case study (Stake, 1985) Collective case study (Yin, 2003)	Idiographic case study • Inductive case study • Theory - guided case study // interpretive // disciplined-configurative Hypothesis - generating case study Hypothesis - testing case study Plausibility probes

Table 4. Short summary of other frequently used typologies of the case study, by the author, 2019.

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[8] Other prominent authors like G. King, R. O. Keohane and S. Verba, D. T. Campbell or else A. George have contributed to typologies of this sort, yet for the sake of brevity they do not appear in this study

3.1.4 Typology of cases & sub-categories

Yin (1984) recommends treating each case as an experiment whether the researcher chooses to use single-case or multiple-case designs. This decision is done prior to any data collection (which occurs concurrently to the analysis) and is based on the propositions to be answered.

Most typically, a single-case design will be chosen when the researcher is facing a crucial, extreme, unique or revelatory case or in regards to a 'pilot-case' used for a further multiple-case study (Yin, 1984). A multiple-case design though will be conducted when the understanding of a phenomenon lies in a whole environment and cannot be reflected in one single case (Baxter & Jack, 2008); in this context, every case serves a specific purpose (Yin, 1984). Besides, a multiple-case design allows an analysis within and across cases, as well as a replication of the findings (Baxter & Jack, 2008; Yin, 1984).

Jason Seawright and John Gerring (2008), as well as John Gerring and Lee Cojocaru (2016) argue that a case study unique attribution depends on the nature of the cases that belong to it. Accordingly, 'representativeness' encompasses cases that are random, typical, conforming, diverse and census. To 'anomalous' belong cases that are idiographic, outcome (also called extreme), deviant and influential. Under 'most-different' (what John Stuart Mill also calls method of agreement) there are exploratory and pathway cases. 'most-similar' (or Mill's method of difference) presents cases that are exploratory, testing and pathway. Finally, to 'crucial case study' belongs testing, most-likely, least-different and pathway cases (Gerring & Cojocaru, 2016; Seawright & Gerring, 2008).[9]

3.2. Comparative methods & within-case methods of analysis

Comparative methods allow the researcher to compare across cases, while within-case methods of analysis enable the researcher to investigate further

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[9] For more information about the case versions, refer to the table "Seven case study types derived from cross-case characteristics (Seawright & Gerring, 2008, pp. 5-6) and the table "Case selection typology" (Gerring & Cojocaru, 2015, p. 12).

causal inferences inside each case (Bennett, 2004; Collier, 1993; Levy, 2008). Different comparative methods and within-case methods of analysis exist and they may be combined with each other to increase the validity of the findings.

Regarding the comparative methods, Mill developed the method of agreement (similar to the least-likely/most-different typology of cases) and the method of difference (similar to most-likely/least-different typology), however both need to fulfill specific conditions in order to work effectively, therefore this method cannot be the only one used for comparison (1970, as cited in Bennett, 2004; Mill, 1843, 1872, as cited in Gerring & Cojocaru, 2016; Mill, 1970, as cited in Levy, 2008). Another approach that has also raised issues in terms of validity is Alexander George's structured focused comparison (1979, as cited in Bennett, 2004 and as cited in Levy, 2008) that uses well-defined hypotheses to guide an analysis of a specific aspect in a range of events. More successful than the previous two is Charles Ragin's qualitative comparative analysis (1987, as cited in Levy, 2008) that appears to be useful when dealing with hypotheses that posit necessary or sufficient conditions.

In regards to within-case methods of analysis, Ragin also created the method of fuzzy sets (2000, as cited in Levy, 2008), which is an in-case classification into categories, similar to the pattern-matching method (Campbell, 1975, as cited in Bennett, 2004, and as cited in Yin, 1984), in order to eliminate alternative causal inferences (Levy, 2008). Next, the method of process tracing (George, 1979, as cited in Levy, 2008) is one of the most popular around the literature in regards to within-case analysis (Bennett, 2004; Collier, 1993; Gerring & Cojocaru, 2016; Levy, 2008); it focuses on intervening variables, examining the in-case development of an event over time and in details, "much as a detective looks for suspects and for clues linking them to a crime" (Bennett, 2004, p. 22; Collier, 1993). Thus, process tracing has its own logic of inference and is different from the pattern-matching method (1975, as cited in Bennett, 2004, and as cited in Yin, 1984). It provides additional evidence for cause and effect (causal mechanisms and reciprocal causation) and it highlights decision-making, judgments, perceptions, preferences, etc. (Collier, 1993; Levy, 2008). Less favored is the congruence testing method,

which translates as "a subset of structured, focused comparisons" (Levy, 2008, p. 10) and is based on the values of the dependent and independent variables of the case compared to other cases to see if the variables are consistent along the initial hypotheses (it is like a poor version of statistical tests of covariations) (Bennett, 2004; Collier, 1993; Levy, 2008). Finally, the counterfactual analysis is a method that works according to the formula "if not -x had occurred in the case, then not -y would have occurred" (Bennett, 2004, p. 25). Unfortunately, this method holds a high risk of confirmation bias.

Amongst these four within-case methods of analysis, only fuzzy sets and process tracing are purely within-case, as congruence testing and counterfactual analysis may involve comparisons to hypothetical/other cases (Bennett, 2004).

3.3. Replication logic

In a multiple-case design, Yin (1984) proposes a replication logic that will make evidence from the findings more reliable (Baxter & Jack, 2008). This replication logic is similar to the one used in scientific experiments, which also differentiates the case study from mere sampling analysis (Yin, 1984).

Yin's replication logic works as follow: according to the study propositions (the hypotheses), the researcher will choose multiple cases. For each case the researcher predicts either 1) that the case will produce similar results than the other cases (literal replication) or 2) that the case will produce divergent results than the other cases but for predictable reasons (theoretical replication) (Yin, 1984). The conditions to these predictions are made according to the theory framework provided by the literature review. After analysis, if all the cases turn out as predicted, then replication may be claimed and it provides robust evidence for the initial propositions. In opposition, if the cases turn out to be in contradiction with the researcher's predictions, then the hypotheses need to be modified, different cases selected and a new replication logic conducted (Yin, 1984).

Yin (1984) additionally suggests a design for the logic of replication, starting with the literature review that will be used as a framework for the cases selection, the data collection process and as mentioned above, the conditions for literal and theoretical replications. Next, each case study will be conducted as an experiment (analysis) then later a cross-case report is made including the results and the conclusions, along with how and why the initial propositions were demonstrated or could not be met. The conclusions of each case will serve as information for the replication (Yin, 1984). These reports allow to grasp the context of the phenomenon and the phenomenon itself and there should be, once again, a return to the initial propositions (Baxter & Jack, 2008).

Figure information: every ——— refers to the ☐ of the same color.

1. DESIGN

- Literature Review [LR] = theoretical framework

- Research question

- Propositions/hypotheses [H] :
  - testing
  - generating
  ⇒ Goal(s)

- Binding the case :
  - boundaries
  - units of analysis
  - single/embedded

Defining the scope of the study

2. DATA COLLECTION

- Theoretical variables/criteria selection

- Case selection :
  - typology of case study
  - typology of case
  - subcategory of case (version)

- Replication predictions : literal or theoretical replication

3. ANALYSIS

- Comparative Methods of Analysis

⇒ Cross-case report (results & conclusion with return to [H])

- Within-Case Methods of Analysis

⇒ Case report (results & conclusion with return to [H])

4. REPLICATION LOGIC

5. TRUST WORTHINESS CHECKLIST

Figure 6. Methodology, by the author, 2019.

3.4. Trust-worthiness checklist

According to Bennett (2004), the case study achieves very high validity construct because it refines theoretical concepts by using contextual variables. In order to assess the quality of the case study, Yin (1984) lists four tests that are commonly used to this intent (tab. 5).

tests	case study tactic	phase of research in which tactic occurs
construct validity	– use multiple sources of evidence – establish chain of evidence – have key informants review draft case study report	data collection data collection composition
internal validity	– do pattern-matching – do explanation-building – do time-series analysis	data analysis data analysis data analysis
external validity	– use replication logic in multiple-case studies	research design
reliability	– use case study protocol – develop case study data base	data collection data collection

Table 5. Four quality tests and tactics. Reprinted from *Case study research: Design and Methods* (vol.5, p. 33), by COSMOS Corporation, 1984, as cited in R. K. Yin, 1984, California, USA: Sage Publications.

3.5. Application to this research[10]

Going back to the methodology proposed by the author (fig. 6) and as mentioned previously, this study chooses to use a qualitative approach mixing comparative method, within-case method of analysis and case study. The first part of the proposed methodology (defining the scope of the study) has already been carried out in the previous chapter.[11] For the rest of it, out of all

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[10] Note that this part is written retroactively, after that the methodology suggested by the author has been applied (Chapter 5 Analysis). Prior to do so, the researcher could not have known the exact designs, typologies or methods to be used in the next chapters.

[11] Chapter 2 Defining the scope of the study

the designs, typologies and methods presented earlier, the author chooses to use the following in the Study analysis.

In the next chapters the author conducts an embedded multiple-case study following Yin's case study research design (1984) complemented by Stake (1995, as cited in Baxter and Jack, 2008). The typology of the case study is at the same time hypothesis-testing (Levy, 2008) along with explanatory and collective (Yin, 2003, as cited in Baxter & Jack, 2008; Yin, 1984). The cases selected however belong to the most-different typology and their exploratory versions (Gerring and Cojocaru, 2016; Seawright and Gerring, 2008).

Regarding the methods of comparison, the author uses the method of agreement (similar to the most-different case typology) for the comparative method (Mill, 1970, as cited in Bennett, 2004; Mill, 1843, 1872, as cited in Gerring & Cojocaru, 2016; Mill, 1970, as cited in Levy, 2008) and process tracing for the within-case method of analysis (Alexander L., George & Bennett, 2004; George, 1979, as cited in Levy, 2008).

Finally, Yin's replication logic is conducted and later the trust-worthiness checklist is reviewed (Yin, 1984).

CHAPTER 4 : DATA COLLECTION

4.1. Theoretical criteria selection

According to Gerring and Cojocaru (2016), there are basic criteria that apply to all case studies:

- Enough accessible data, from reliable sources
- Independence: as explained in the previous chapter, the research question implies a causal claim; therefore the chosen cases must be independent of each other and of other cases in the population
- Representativeness: "most-different cases that are broadly representative of the population will provide the strongest basis for generalization" (Seawright & Gerring, 2008, p. 6). In this study it has been established that the population of interest is: interactive digital artworks involving Gamified Interaction.[12]

In addition, some criteria are the qualities attached to the type of cases and subcategories of cases they belong to. As demonstrated in the previous chapter, the Explanatory research question of this study led to define two hypotheses (based on the literature review), which themselves point to cases pertaining to the typology most-different and its subcategory exploratory. For the most-different case typology, cases selected need to:

- Share a common outcome (Y) (Gerring & Cojocaru, 2016)
- To be different on specified variables other than X and Y (Seawright & Gerring, 2008), meaning different on (Z)

Regarding the exploratory version of this design, the chosen cases need to:

- Minimize variation in the outcome (Y) and maximize variation (dissimilarities) in the background characteristics regarded as potential causes (Z), represented under the formula: Min (VarY); Max (VarZ) (Gerring & Cojocaru, 2016).

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[12] Chapter 2 Defining the scope of the study

Finally, for a case study that uses the most-different typology of cases and its exploratory version, Gerring and Cojocaru (2016) recommend selecting two or more cases. For the sake of brevity, this study chooses to use only two cases for each sub-unit of analysis (the two hypotheses), which makes a total of four cases.

4.2. Cases selection

H1: 'Playing a game' (X) fosters co-creation (Y) in an artwork-event.

The goal is to provide evidence of a causal relationship, where X is the causal factor of interest and Y is the outcome of interest (Seawright & Cojocaru, 2011). This goal is represented under the formula $X \rightarrow Y$ (Gerring & Cojocaru, 2016).

- **Case 1:** The Beast, Microsoft, 2001
- **Case 2:** Cow Clicker, Ian Bogost, 2010

H2: Participant-centered approach in Gamified Interaction (X) is a necessary condition to the occurrence of a gamified artwork-event (Y).

The goal is to attempt to eliminate a causal factor, where X is the necessary variable and Y is the outcome of interest. This goal is represented under the formula $\cancel{X} \rightarrow Y$ (Gerring & Cojocaru, 2016).

- **Case 3:** Tweetris, Derek Reilly, Fanny Chevalier & Dustin Freeman, 2011
- **Case 4:** BURP, Janus Kristensen, 2004

4.3. Cases description

4.3.1 Case 1: The Beast, Microsoft, 2001

For the release of the sci-fi drama movie A.I. Artificial Intelligence (directed by Steven Spielberg), Microsoft was commissioned by Warner Bros and Dreamworks to create a marketing promotional campaign. 'The Beast' launched 3 months prior to the A.I. Artificial Intelligence movie and it is still referred to to this day as one of the first successful large-scale ARG (McGonigal, 2003b).

The ARG genre was born in the nineties with the advent of Internet and is considered an immersive interactive experience that consists of games taking place online and offline, in the form of puzzles to be solved, codes to be cracked, and activities to be executed, revolving around an emerging storyline (Hansen, Bonsignore, Ruppel, Visconti & Kraus, 2013). The specificity of ARGs is that they pretend not to be a game and try to pass off as real, following the TINAG rhetoric, rather than sticking to standard game paradigms (Fallon & Darvasi, 2017; Szulborski, 2005).

By using everyday-life elements and technologies as components of the game, ARGs make the real-life world the game space for the participants, blurring physical, temporal and social frontiers between real life and game world and leading to a high level of immersion (Hook, 2016). Therefore, participants see game patterns in non-game places and become suspicious of their everyday surroundings because everything becomes a potential clue (McGonigal, 2003a; McGonigal, 2003b). ARGs try to immerse the world of the game into the participant's real life (making it a layered reality), thus alternating the participant's reality (Fallon & Darvasi, 2017; McGonigal, 2003b; Szulborski, 2005).

According to Dave Szulborski (2005), ARGs start with 'rabbit holes', which are departure points to draw the participant in the game. They take the form of hidden clues and signs that appear realistic and intriguing enough for people to start hunting and investigating them. Therefore ARGs are 'games of progression': as the participant digs deeper and overcome new challenges, mysteries are unraveled and story fragments uncovered (Montola, 2009, as cited in Hansen, Bonsignore, Ruppel, Visconti & Kraus, 2013; Fallon & Darvasi, 2017). A core characteristic of ARGs is the 'collective intelligence' formed by the community of participants who work together to find, connect and collect disparate components, information and resources that participate in and solve the narrative (Jenkins et al., 2006, as cited in Bonsignore, Kraus, Ahn, Visconti, Fraistat & Druin, 2012; Fallon & Darvasi, 2017; Hook, 2016). Hence the ARG is a cross-border and cross-time collaborative experience whereas participants gather offline for real world events but also organize

online by shifting the conversation around ARGs to blogs, websites, forums and chats in order to band together, contribute and pool their resources (Fallon & Darvasi, 2017).

Therefore, ARG is a kind of transmedia storytelling since the game operates upon a multitude of distributed networks and technologies that host pieces of the ARG story (Jenkins, 2006, as cited in Hansen, Bonsignore, Ruppel, Visconti & Kraus, 2013). However, ARGs do not need the latest and most outstanding technologies, rather the genre relies on everyday digital devices and features, which as mentioned before blurs the line between truth and fiction (Bonsignore, Kraus, Ahn, Visconti, Fraistat & Druin, 2012).

The Beast storytelling takes place in 2142 AD, forty years after A.I. Artificial Intelligence and it centers its story on the characters of Dr. Jeanine Salla and her friend Evan Chan. One day Dr. Salla gets a cryptic note revealing that her friend Evan who died in what appeared to be an accident with his A.I.-enhanced boat has actually been murdered. From there, Dr. Salla discovers that her friend has been murdered by his companion-bot Venus that had been reprogrammed to kill. This finding exposes numerous other cases of assassinations of both humans and A.I., which leads to a global referendum to decide if A.I. should be treated equal to citizens.

When The Beast launched, no rules were disclosed, it never presented itself as a game and the creators of the game never claimed it (McGonigal, 2003b). These creators are called puppetmasters and are at the same time story architects, transmedia producers, and experience designers. Their goal is to create an interfaceless and blended journey for the participants (Hook, 2016). The Beast started with two different rabbit holes disclosed to the future participants for entering the game: the movie trailer credits disclosing "Dr. Salla - Sentient machine therapist" and Dr. Salla's alleged phone number in another trailer and promotional posters (fig. 7). All hints (the great majority of the game content) were always pointing back to diegetic fictional websites with different names (fig. 8), yet all registered under the domain name 'Ghaepetto' and using the same IP address (a network of more than forty

websites was created and referenced online at Cloudmakers.org, a Yahoo! Group created by the participants of the game).[13] Some online news blogs were also contacted to disclose information/clues and high-profile publications soon began to spread in the news worldwide, which gave The Beast a lot of believability (McGonigal, 2003a; McGonigal, 2003b).

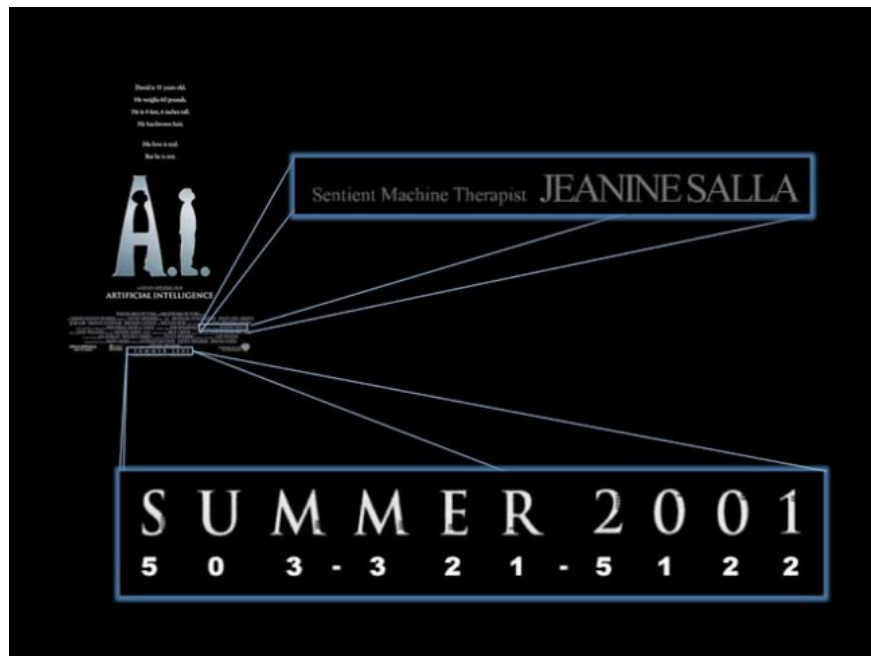*Figure 7.* Artificial Intelligence movie promotional poster with rabbit holes [Image] (Stewart, 2006). Retrieved from http://www.seanstewart.org/the-beast-2001-a-k-a-the-a-i-web-game/


Figure 8. Diegetic fictional website. [Image] (Ferret, 2018). Retrieved from https://itsnotreal.hypotheses.org/

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[13] The Cloudmakers Yahoo group of 8000 participants: https://yhoo.it/2NBJQiv

Throughout the development of the game, the participants were reached out to via faxes, text messages, phone calls, mail deliveries, emails, national television commercials, audio recordings, graffiti in public bathrooms, prints ads, face-to-face characters meetings, strategic places, and digital photographs, all archived on Cloudmakers.org (McGonigal, 2003a; McGonigal, 2003b). The puppetmasters of The Beast declared that they purposefully made puzzles that could only be successfully solved collaboratively; participants had to cooperate as the challenges required "programming, translating and hacking skills, obscure knowledge of literature, history and art, and brute computing force" (McGonigal, 2003b, p. 2). The game was being developed as it was being played and influenced directly by the Cloudmakers' discussions and assumptions. It was set from the beginning that new in-game updates and events will occur every Tuesdays and it eventually evolved into three core mysteries, more than a dozen of subplots and around 150 characters. Allegedly more than one million participants took part in The Beast and the production cost of the game was of $1,000,000 (McGonigal, 2003b; Szulborski 2005).

According to the definition of Gamified Interaction as perceived by the audience in Chapter 2, in the case of The Beast the artist designers are the puppetmasters at Microsoft, the human audience is the community of participants, the digital artifact is the network of diegetic websites and the co-created final artwork-event is the solved mystery narrative of The Beast (fig. 9).
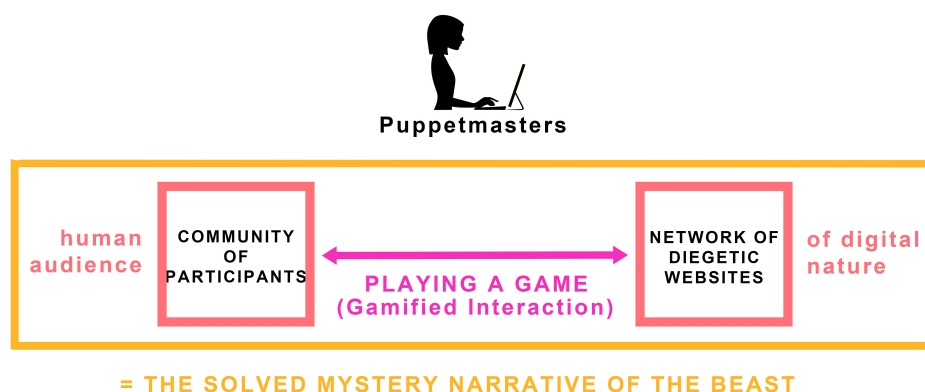
Figure 9. Gamified Interaction perceived as 'playing a game', by the author, 2019.

4.3.2 Case 2: Cow Clicker, Ian Bogost, 2010

On the first hand, Cow Clicker belongs to the genre of social games, that belongs to casual games, which are simple games that do not require special skills or knowledge to be played and that can be played at anytime of the day and be squeezed between daily responsibilities (Cusack, Martens & Mutreja, 2006). In social games participants are encouraged to share their in-game actions on social networks and to invite their online friends to join them. The participant has little effort to do in the game and little meaningful choices to make, "social games are games you don't have to play" (Bogost, 2010). Cow Clicker is a Facebook game about Facebook games. It is at the same time a satire of social games while being a social game itself (Alexander, 2010b; Bogost, 2010).

On the other hand, Cow Clicker belongs to the genre of incremental/idle/clicker games, which Sultan Alharthi, Zachary Toups, Olaa Alsaedi, Joshua Tanenbaum and Jessica Hammer (2018) propose to further differentiate. In incremental games, the participant clicks to generate resources, wait for them to grow, then invest them to get more resources. The gameplay is reduced to repetitive actions and commonly features an in-game economy (Alharthi, Toups, Alsaedi, Tanenbaum & Hammer, 2018; Deterding, 2016). Idle games are a superset of incremental games that can progress without the participant's interaction; the game is running in the background while the participant waits. Finally, clicker games like Cow Clicker are also a superset of incremental games where the participant is rewarded for her clicks (Alharthi, Toups, Alsaedi, Tanenbaum & Hammer, 2018; Purkiss & Khaliq, 2015).

Thus the core mechanics of incremental games are to click and to wait, an infinite goal (increasing point total), usually there are no game-over or death conditions, resources accumulation is seen as a sense of progression and new unlocked elements are seen as discovery (Adams & Dormans, 2012, as cited in Alharthi, Toups, Alsaedi, Tanenbaum & Hammer, 2018). In addition, incremental games enable different levels of interactivity, going from zero-player involvement (automate gameplay), to minimalist input, up to clicker

games that require the most interactivity (Alharthi, Toups, Alsaedi, Tanenbaum & Hammer, 2018; Purkiss & Khaliq, 2015). Incremental games were born in the 2000s to critique progress mechanics in role-playing games, social games or gamification, trying to demonstrate the absurdity of such genres and how they were not 'real games' for 'real gamers' (Deterding, 2016). Incremental games also gained in popularity these last few years because of their ease of accessibility and the current trend of multitasking and efficient time-management (Purkiss & Khaliq, 2015).

Cow Clicker was created in the first place to test a theory about social games and therefore it framed frame the four concerns that Ian Bogost sees in social games (Tanz, 2011): enframing, compulsion, optionalism and destroyed time (Alexander, 2010b; Bogost, 2010). The first comes from Martin Heidegger's critique of technology; social networks tend to be enframing platforms as they consider things and people only as resources to help the participant and the game developer to go upper and forward in the game. Next is compulsion, with social games compelling the participant to keep playing, abusing them through feelings of obligation, worry, and dread over missing out (Alexander, 2010a; Bogost, 2010). Regarding optionalism, it is the option of by-passing in-game actions that would require some time, by buying them out. Finally, social games are time consuming for the participant as well as for the developer of the game, either when they spend long periods of attention completing some repetitive or empty demands, or when they are away and this time is stolen from them.

The rules of Cow Clicker are very simple: there is a picture of a cow that the participant can click every six hours, each click being worth one point and getting the participant more clicks. The participant can buy some 'mooney', the in-game currency, to buy more cows (fig. 10) or to by-pass the time-restrictions for clicking. She can also publish her in-game actions on her Facebook newsfeed and invite friends to her 'pasture' to click her cow so she can get more points (fig. 11). A leaderboard references the best participants of the game (Bogost, 2010; Tanz, 2011).

*Figure 10*. Cow Clicker snapshot [Image] (Bogost, 2017). Retrieved from http://www.cowclicker.com/

Figure 11. Cow Clicker snapshot [Image] (Steinberg, 2010). Retrieved from http://edition.cnn.com/2010/TECH/gaming.gadgets/08/17/social.games.spoofs /index.html

At its peak Cow Clicker generated 25,000 monthly active participants (Alexander, 2010b) and 56,000 total participants (Tanz, 2011), clicking around two million times (Alexander, 2010a). It all ended with the Cowpocalypse on September 7, 2011, that made all the cows of the game disappear, leaving from this day onwards only the pastures to be clicked for points (Tanz, 2011). Cow Clicker was meant to be a short experience, yet it enslaved its participants and Bogost himself for more than 18 months (Tanz, 2011). 'Traditional' game developers had strong words to describe the Cow Clicker game too as many of them did not get the irony of it and see in Social Games the hand of capitalism to the expense of creativity and design (Alexander, 2010b; Bogost, 2010).

According to the definition of Gamified Interaction as perceived by the audience in Chapter 2, in the case of Cow Clicker the artist designer is Ian Bogost as the manipulative social game developer, the human audience are the participants on Facebook, the digital artifact is Cow Clicker on Facebook and the co-created final artwork-event is the Cow Clicker community (as the goal of the game is infinite) (fig. 12).
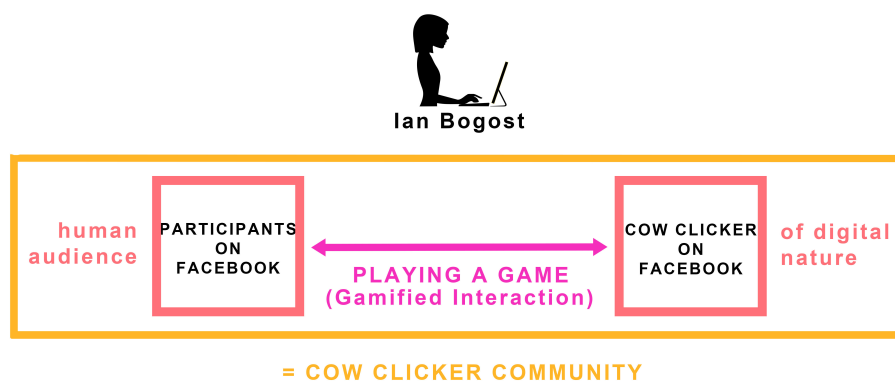
Figure 12. Gamified Interaction perceived as 'playing a game', by the author, 2019.

4.3.3 Case 3: Tweetris, Derek Reilly, Fanny Chevalier & Dustin Freeman, 2011

Tweetris is a digital participatory art Installation based on whole-body interaction (WBI) in a game-within-a-game format at a public event (Freeman, LaPierre, Chevalier & Reilly, 2013; Reilly, Chevalier, & Freeman, 2014).

Tweetris was created in 2011 for HCI research purposes and is the result of collaboration between researchers, computer scientists and independent artists (OCADU, 2012). It lies at the intersection of art, sciences (research) and technology. The project was first exhibited at the Nuit Blanche in Toronto then later at the Nocturne: Art at night festival in Halifax.

Interaction in art has always existed as mentioned previously in this paper, through different techniques developed throughout the years (Edmonds, 2014) and interactive art as a genre is the combination of different disciplines that are closely linked with each other: kinetic art, art of action, installation art, art of electronic media and conceptual art (Kluszczynski, 2013). [14] Even though interactive art existed before the advent of digital technologies, connectedness generates a feeling of immersion, along with innovative resources (Edmonds, 2014).

Tweetris is described as a mash-up between Tetris, yoga and Twitter and its mechanics were inspired from the Japanese show Brain Wall (OCADU, 2012). [15] In Tweetris there are two participants playing against each other; they are standing in front of a video screen overlaid with a grid and each of them is assigned a specific color. Two random identical Tetrominos (four-blocs Tetris-style silhouettes) appear on the big screen and the goal of the artwork-event is for each participant to reproduce the shape with their body (fig. 13). The participant needs to hold the pose for at least two seconds, while her assigned color fills the on-screen silhouette and while the progress bar on top of the screen completes to score a point. Once a shape is nailed, two new identical Tetrominos appear on screen. If none of the participants manage to reproduce the on-screen Tetromino within ten seconds, a new random shape appears. When one of the participants makes ten shapes, the counters are reset (Reilly, Chevalier, & Freeman, 2014).

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[14] Chapter 1 Background of the study

[15] Watch the film made about the Tweetris exhibition at Nuit Blanche in Toronto: https://www.youtube.com/watch?v=WR3eW4eYsyI
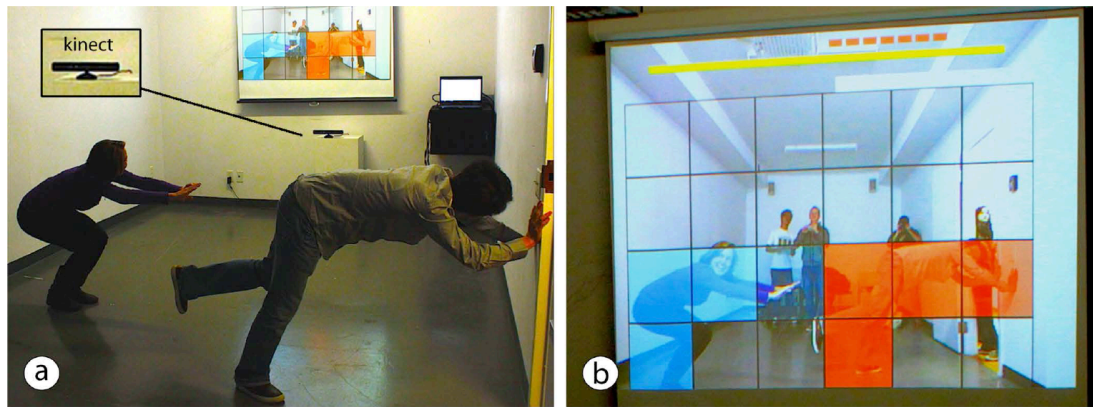
Figure 13. Matching Tetrominos. Reprinted from "Tweetris: a study of whole-body interaction during a public art event", by D. Freeman, N. LaPierre, F. Chevalier and D. Reilly, 2013, *the 9th ACM Conference on Creativity & Cognition*, p. 225.

In Tweetris there can also be no participants at all, yet the live Tweetris game is still running in the background. Tweetris does not have hard rules that need to be followed, participants thus can enter or exit the exhibition space whenever they want (Freeman, LaPierre, Chevalier, & Reilly, 2013).

Besides, participants taking part in the artwork-event are not only performing for the audience at the exhibition; since the installation uses a Kinect device and a screen, they also perform for themselves. Moreover, pictures are taken of the fastest participant to successfully achieve a Tetromino, then they are used as the shapes in an online Tetris game that anyone can play on their digital devices (fig. 14 & 15) (Freeman, LaPierre, Chevalier, & Reilly, 2013). Therefore, to some extent participants also compete for fame and perform for the online gamers who will see their faces in the online Tetris game. Finally, the artwork-event at the Nuit Blanche was also live streamed and projected onto a nearby building. Hence participants were also performing for an audience outside the exhibition (Reilly, Chevalier, & Freeman, 2014).
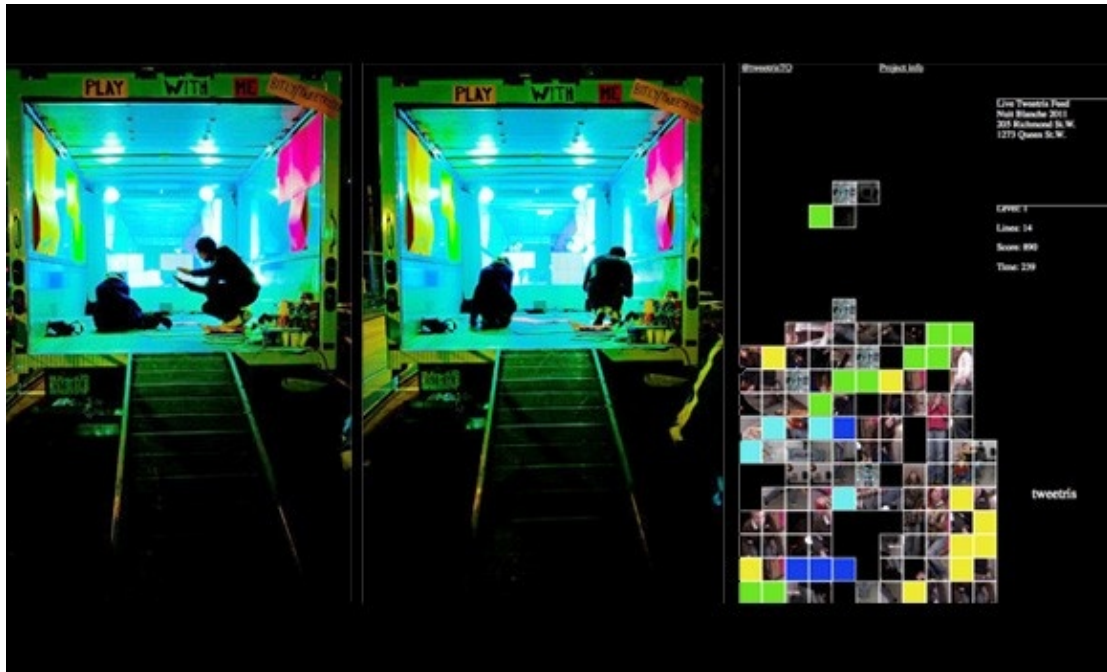
Figure 14. Tweetris [Image] (Wooler, 2012). Retrieved from https://www.dal.ca/news/2012/10/12/a-game-you-can-put-your-whole-body-into--tweetris-hits-the-stree.html

Figure 15. Online Tetris shapes made of participants' pictures. Adapted from "Human Computer Interaction, Art and Experience", by E. A. Edmonds. L, Candy and S, Ferguson (Eds.), *Interactive Experience in the Digital Age: Evaluating New Practices* (p. 166), 2014, Switzerland: Springer.

According to the definition of Gamified Interaction as perceived by the audience in Chapter 2, in the case of Tweetris the artist designers are Derek Reilly, Fanny Chevalier and Dustin Freeman, the human audience are the

exhibition attendees, the digital artifact is the Tweetris art installation and the co-created final artwork-event is the whole set of Tweetris performances (the live Tweetris game, the pictures thread of the live Tweetris game on Twitter, the online custom Tetris and the projected live Tweetris outside the exhibition place) (fig. 16).
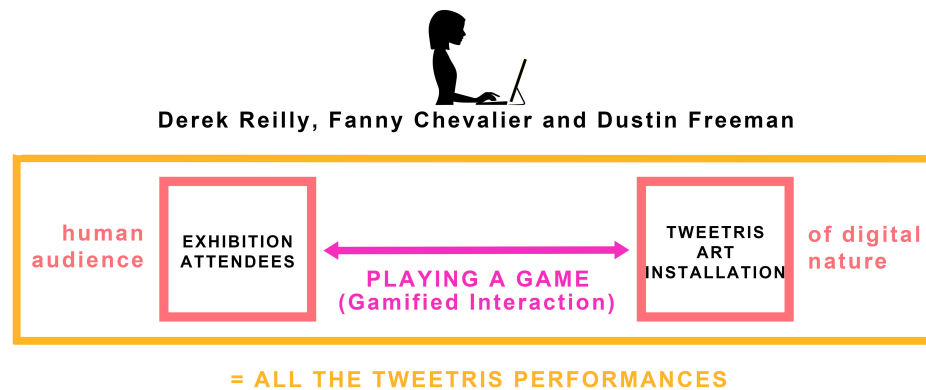
Figure 16. Gamified Interaction perceived as 'playing a game', by the author, 2019.

4.3.4 Case 4: BURP, Janus Kristensen, 2004

BURP (Big and Ugly Rendering Project) is a publicly distributed system rendering 3D animations, which are made with specialized computers software that generate images out of 3D models (RenderfarmFi, 2011). It was launched online in 2004 and is still going on even though there is no project running at the moment.[16]

BURP belongs to the category of VCPs, which is apart of the field of HCI. As mentioned earlier in this paper,[17] in VCPs citizen volunteer to donate their personal computers spare capacity for computing projects that require a lot of energy (Aristeidou, Scanlon & Sharples, 2017; Darch & Carusi, 2012). These projects are often so energy-demanding that it would take years to achieve them, yet with the help of citizen's computing resources the rendering task can be done in a shorter amount of time (fig. 17).

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[16] https://burp.renderfarming.net/

[17] Chapter 1 Background of the study

Figure 17. Snapshot of the short animated film Uyir [18] rendered with BURP [Image] (Danan, 2015). Retrieved from http://thilakanathanstudios.com/2015/03/creating-an-animated-short-film/

Since 2002 most of the VCPs run through the platform Berkeley Open Infrastructure for Network Computing (BOINC).[19] BOINC was developed by Berkeley University in 2002 and acts as an intermediary between citizen and VCPs. The volunteer first needs to download BOINC then once the application is opened she can choose to which project she wants to donate her computer spare power/storage. The platform may be working in the background and does not require specific actions from the participant.[20] BURP uses the software Blender and is supported on Linux, Mac, Windows and Android.

BURP architecture is 'open by design', which means that the only projects available in the system are the ones people submit and that need rendering. Hence sometimes there are no projects available to contribute to. Besides, BURP is community-based as all the files sent by the participants are made public and anybody has access to them (RenderfarmFi, 2010). In Addition, BURP also only works with open source systems (Blender and BOINC) and participants can even join in writing BURP code (RenderfarmFi, 2010).

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[18] Watch the complete animated film: https://www.youtube.com/watch?v=F319FkKEImA

[19] https://boinc.berkeley.edu/

[20] More information on how BOINC works: https://boinc.berkeley.edu/wiki/How_BOINC_works

For their subscription to BURP website, volunteers can decide to join a pre-existing team or to create one. People team up by countries, around a certain theme or randomly. When renderings are done for a project, the participant scores some points that will be added to her team and be disclosed in different public rankings available on BURP website.[21]

In the BURP forum back in 2014, Janus Kristensen posted that over 1111 sessions had been rendered, which would correspond to 383,321 dollars savings for the participants (Kristensen, 2014). In addition, Kristensen noted that BURP as a render farm was generating twice more power than the number one super computer in the world (RenderfarmFi, 2010).

According to the definition of Gamified Interaction as perceived by the audience in Chapter 2, in the case of BURP the artist designer is Janus Kristensen, the human audience are the volunteers, the digital artifact is BURP and the co-created final artwork-event is the rendered 3D animation (as a VCP) (fig. 18).
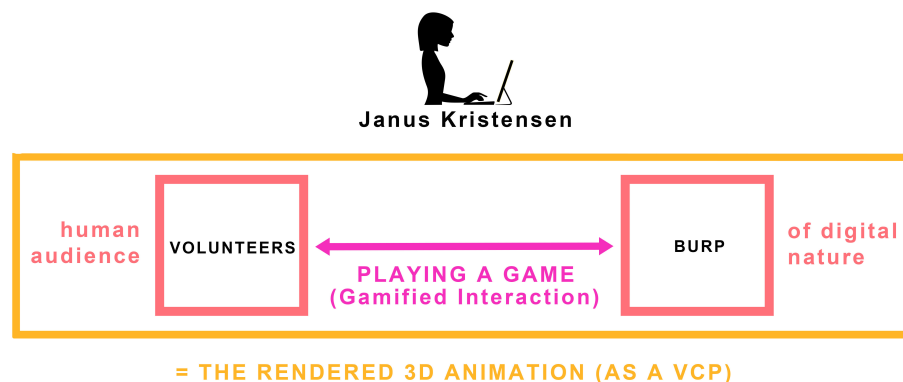
Figure 18. Gamified Interaction perceived as 'playing a game', by the author, 2019.

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[21] Like top participants, top computers, top teams

4.4. Criteria checklist

	H1: 'Playing a game' (X) fosters co-creation (Y) in an artwork-event.		H2: Participant-centered approach in Gamified Interaction (X) is a necessary condition to the occurrence of a gamified artwork-event (Y).	
	Case 1: The Beast	**Case 2: Cow Clicker**	**Case 3: Tweetris**	**Case 4: BURP**
Data	Peer-reviewed articles, interviews, conference papers, websites, books	Peer-reviewed articles, interviews, conference papers, website	Peer-reviewed articles, conference paper, academic papers, books, videos, websites	Peer-reviewed articles, videos, website
Independence	√ Independent of the other case and the population	√ Independent of the other case and the population	√ Independent of the other case and the population	√ Independent of the other case and the population
Representativeness	√ Presents an artist designer, a human audience, a digital artifact and a final co-created artwork-event	√ Presents an artist designer, a human audience, a digital artifact and a final co-created artwork-event	√ Presents an artist designer, a human audience, a digital artifact and a final co-created artwork-event	√ Presents an artist designer, a human audience, a digital artifact and a final co-created artwork-event
Common outcome Y	Y = co-created final artwork-event		Y = occurrence of a gamified artwork-event	

53

	The solved mystery narrative of The Beast	Cow Clicker community (as goal of the game is infinite)	The whole set of Tweetris performances	The rendered 3D animation (VCP)
Other variables than X and Y (Z), with Max (VarZ)	Z = ARG genre, gameplay by different puzzles, set goal, multiple channels of information, narrative, game taking place offline and online, collaboration between participants required, interfaceless: immersion, participants play as themselves and components of the game are everyday life elements	Z = clicker game genre, gameplay repetitive, infinite goal, information through Facebook, no narrative, game taking place exclusively online, collaboration between participants as bonus resource, tangible interface: no immersion, participants play with their Facebook alias, in-game components only	Z = public participatory art, exhibited in public space, punctual ('one-shot'), audience performing, taking place online and offline, artwork already there to interact with, participants do not take part in the digital artifact structure, 'playing a game'	Z = distributed rendering system, exclusively online, short or long-term, no performance, taking place exclusively online, participants give away resources, artwork proposition brought by the participants, Gamification affordances

4.5. Replication predictions

H1: 'Playing a game' (X) fosters co-creation (Y) in an artwork-event.

The goal is to provide evidence of a causal relationship. Here X is the causal factor of interest and Y is the outcome of interest (Seawright & Cojocaru, 2011). This goal is represented under the formula X → Y (Gerring & Cojocaru, 2016).

- **Case 1:** The Beast, Microsoft, 2001
- **Case 2:** Cow Clicker, Ian Bogost, 2010

For the first case study presenting two cases, in regards to the theory framework provided by the literature review, the researcher predicts that both cases will produce similar results, namely a literal replication.

H2: Participant-centered approach in Gamified Interaction (X) is a necessary condition to the occurrence of a gamified artwork-event (Y).

The goal is to attempt to eliminate a causal factor, where X is the necessary variable and Y is the outcome of interest. This goal is represented under the formula $\cancel{X} \to Y$ (Gerring & Cojocaru, 2016). As a matter of fact, Bennett (2004) states that if the hypothesized necessary variable X to the occurrence of Y can be shown to have been absent in even a single case in which the outcome Y occurred, then it shows evidence that the variable X is not a necessary condition to the outcome Y.

- **Case 3:** Tweetris, Derek Reilly, Fanny Chevalier & Dustin Freeman, 2011
- **Case 4:** BURP, Janus Kristensen, 2004

For the second case study presenting two cases, in regards to the theory framework provided by the literature review, the researcher predicts that the two cases will produce divergent results for predictable reasons (theoretical replication). The main reason suspected to lead to different results is that Case 3 supports an instance of Gamified Interaction corresponding to the definition provided by this study, while Case 4 does not.

Whether literal or theoretical, after analysis if all the cases turn out as predicted, then replication may be claimed and it provides robust evidence for the initial propositions. In opposition, if the cases turn out to be in contradiction with the researcher's predictions, then the hypotheses need to be modified, different cases selected and a new replication logic conducted (Yin, 1984).

CHAPTER 5 : ANALYSIS

The analysis is divided into two main parts according to the two different hypotheses. For each hypothesis, both a cross-case analysis and a within-case analysis are conducted with their two respectively selected cases from the previous chapter.

It may be useful to remind that the four cases are independent of each other and from the cases in the population, and that they are all representative of interactive digital artworks involving Gamified Interaction (Gerring and Cojocaru, 2016). Consequently, as the four cases, namely The Beast, Cow Clicker, Tweetris and BURP are related to play and involve interaction, they are all art forms (Flanagan, 2009), which is demonstrated once again in the following analysis.

5.1. Analysis for hypothesis 1: cases 1 & 2

H1: 'Playing a game' (X) fosters co-creation (Y) in an artwork-event.

The goal is to provide evidence of a causal relationship, where X is the causal factor of interest and Y is the outcome of interest (Seawright & Cojocaru, 2011). This goal is represented under the formula $X \rightarrow Y$ (Gerring & Cojocaru, 2016).

- **Case 1:** The Beast, Microsoft, 2001
- **Case 2:** Cow Clicker, Ian Bogost, 2010

5.1.1 Cross-case analysis/comparative method: method of agreement (aka most-different case typology)

In order to support a causal relationship between X and Y, the author will deconstruct the hypothesis in three respective parts and analyze each of them separately in regards to the theory framework given by the literature review.

Playing a game

As mentioned elsewhere in this paper,[22] an audience often mistakes fake interactivity, tricked interactivity or reactivity for real interactivity. Therefore in Gamified Interaction, what the participant perceives is her interacting with a game (Maja de Araújo, 2017). As she feels like she is 'playing a game', the author will analyze play and games in the cases of The Beast and Cow Clicker.

First of all, a reminder that there are two different activities for play: paida, which is a free and spontaneous playing activity and ludus, which means gaming, as play structured by rules, goals and competition (Caillois, 2001, as cited in Deterding, Dixon, Khaled & Nacke, 2011). Both The Beast and Cow Clicker have rules that the participant needs to follow in order to continue to be playing; which makes them games and participants taking part into them are therefore gaming (ludus).[23]

In The Beast, the frontier between real-life and game world is blurred to the point where the game becomes a layer to the participant's everyday life. Therefore, one could wonder where are the limits of this game, whether physical or moral since the participant is so immersed in it she starts seeing play everywhere, in everything. As mentioned previously, inside the magic circle, the actions of the participant are re-signified, she can do things she is not allowed to do in real life (Waern, 2012). However, in The Beast this possibility space seems to have no boundaries and to be infinite (Bogost, 2008). McGonigal (2003b) notes that following the TINAG rhetoric, fervent participants (fans) continue seeing games where there is none, to the point where they believe so hard that it exists, they bring it into existence or that they can hijack a game that is over and continue to play it even if there will never be new clues (McGonigal, 2003b). In that situation, play becomes a trap, it is not a voluntary act anymore, which goes against the notion of play that has been looked up to for decades (Huizinga, Caillois, Sutton-Smith) and that this paper chose to follow too (McGonigal, 2003a).

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[22] Chapter 1 Background of the study and Chapter 2 Defining the scope of the study
[23] (fig. 2) in Chapter 1 Background of the study

Moreover, about games designers, Miguel Sicart (2011) argues that they hold a dominant position upon the participants, as they are the ones who create the mechanisms of the game. Therefore, the artist designer will always be playing the participants (Sicart, 2011). In the example of the Beast, Sicart's argument seems to be confirmed as the artist designers are called the puppetmasters of the game. Even with the lack of rules as in The Beast, puppetmasters have an absolute control over the participants, as they are crafting the narrative as it is being played, which means that even in situations of ruptures or discrepancies, puppetmasters remain the ultimate story architects, transmedia producers, and experience designers of the game (Hook, 2016). They are the gods of the participant's layered-reality.

Given what can be considered as submission to the authority of the game/artist designer, one can wonder what is the leeway of the participant for meaning-making in the context of ARGs? First of all, Sicart (2011) observes that play starts within the participant, it is the result of her creative expression. It is the appropriation of the rules by the participant and in that sense play is personal (it is what the participant brings in and provides to the game). Therefore play is a dialogue between the participant and the system (De Koven, 2002, as cited in Sicart, 2011). From that understanding, the artist designer is not dominant anymore because participants do not need her: they need a game, an excuse and a frame for play. Second, there is a way through which ARGs like The Beast are limited; this is what McGonigal labels 'performed belief' (2003a). In fact, along the journey of The Beast, participants could have exposed its gameness on numerous occasions: a participant discovered that all the websites which where supposed to belong to different (fictional) institutions/individuals/companies, were actually related to each others forming a network. Another time, it was revealed that Microsoft was behind The Beast. Or when an actor during a live event went out of character and spoiled the game (McGonigal, 2003a). Yet the participants collectively chose to ignore these ruptures of the game that were making it visible, in order to maintain the Beast illusion of reality. Similarly, when participants would discover discrepancies in the game, they would choose to look for and believe diegetic explanations justifying them. Participants in The Beast

continue to play 'as if', performing reality whenever the credibility of TINAG is undermined (McGonigal, 2003a).

Performing reality is therefore a testament to the audience's complicity in The Beast; participants are taking responsibility for their own immersive experience by maintaining the curtain behind which the puppetmasters create the magic of the game; this is what is called the 'wizard's curtain' (Hook, 2016; McGonigal, 2003a). This curtain works as a tacit social contract: the puppetmasters maintain it in order to create the most coherent game experience for the participants, while in exchange the latter are 'fair-play' and do not look behind the curtain how it is done (Hook, 2016). Therefore, even though The Beast comes with no system of rules (sticking to the TINAG rhetoric), there is in fact one very important tacit rule: maintaining the wizard's curtain.

This rule prevents the participants from taking actions that could actually be useful in the game (Suits, 1978). In The Beast, participants accept to use limited and less efficient means to resolve the mystery narrative (i.e. solving complex puzzles), just for the pleasure of believing and so the game can go on, which Zimmerman (2003) calls 'lusory attitude'. In The Beast, experiential motivations are primary, even if the end goal of the game is clear, it comes after as it belongs to the magic circle (Apter, 1989, as cited in Waern, 2012). If the constitutive rule of the wizard's curtain is broken, the game cannot go on since participants are not playing anymore (Suits, 1978).

Therefore, the magic circle in ARGs like The Beast is delimited by performed belief and the maintenance of the wizard's curtain. According to Huizinga (1938), the participant finds meaning in her activity of play by making choices and taking decisions inside this possibility space (Bogost, 2008). In fact, the TINAG rhetoric used in The Beast incites critical thinking because participants are responsible for distinguishing 'truth' from fiction, it also teaches them counterfactual thinking which is the 'what-if?' alternative(s) as the frontier between 'what's real' and 'what's not' is unclear, it develops information literacy practices (such as evaluating and sharing information across multiple

media, analyzing and solving complex problems, and using new media tools for meaning-making) (Jenkins et al., 2006, Johnson et al., 2010, Whitton, 2008, all as cited in Bonsignore, Kraus, Ahn, Visconti, Fraistat & Druin, 2012), it prompts creativity, and it instigates collaboration and resilience (Fallon & Darvasi, 2017). Thus in The Beast, meaning-making occurs through education, provided by the TINAG rhetoric. In fact, as Olli Tapio Leino (2014) remarks, playing (exploring the magic circle) is linked to the notions of responsibility and freedom. As mentioned before, in The Beast, the audience is responsible for their own immersive experience (McGonigal, 2003a): with decision-making comes the possibility of failing, which makes the participant responsible for the freedom she enjoys (Leino, 2014).

Furthermore, Jane McGonigal (2003a) suggests that ARGs enable their audience to tackle major real life issues (like war, terrorism, unsolved crimes etc.) as if they were a game, because the participants have approached these problems already in the layered-reality. In that sense, playing The Beast is like practicing real life for the real life, and nurturing the desire that real life can be a game too. Actually, as mentioned previously in this study,[24] according to procedural rhetoric (PR) the game bears representations and models of the real world that can be understood by playing the game and later used in the participant's real life (Dugan, 2006, as cited in Bogost, 2008). Therefore in The Beast the participant also finds meaning through projected desire, promoted by the TINAG philosophy.

As The Beast is a multiplayer game, that focuses on collaboration between the participants, and that creates a space for dialogue between the audience and the artist designers (the feedback loop created between puppetmasters monitoring the participants' progress and actions and in return feeding them information) (Szulborski, 2005) it ticks all the criteria of 'abusive game designs' (Wilson, 2011; Wilson & Sicart, 2010). In these designs, participants are pushed to their breaking point, just enough to go out of their comfort zone, yet not too much in order to prevent them from quitting the game (Wilson,

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[24] Chapter 1 Background of the study

2011; Wilson & Sicart, 2010). In The Beast this resistance shows in the hidden clues that participants need to find and in complex puzzles that they need to crack and solve.

Under the umbrella of abusive game designs, The Beast belongs to the genre of immersive games.[25] McGonigal (2003) observes that this genre is distinct from pervasive games on several points: first, pervasive games are usually born in Asia or Europe, the gameness shows with no effort to hide it, the genre relies on other technologies thus there is a symbolic interface that demarcates the game from real life and finally, participants can finish the game on their own without ever collaborating with others. Whereas immersive games usually are born in the USA, the TINAG rhetoric erases all metacommunication, they use everyday life elements as components of the game therefore they do not rely on other games or interfaces and lastly, collaboration and community are required to advance in the game (McGonigal, 2003a; McGonigal, 2003b).[26] Besides, compared to MMORPGs, in The Beast the participants do not take on roles through avatars, they play as themselves and other participants become the living backdrop of the layered reality (Bonsignore, Kraus, Ahn, Visconti, Fraistat & Druin, 2012; Fallon & Darvasi, 2017; Szulborski, 2005). The participants' experience in The Beast is real from a phenomenological point of view (McGonigal, 2003b).

On another note, subversion in games is also worth being acknowledged for meaning-making. In The Beast participants get the opportunity to take on the role of detectives, to resolve mysteries, and to fight terrorism or dystopian robotics. As a matter of fact, the topic of subversive games is usually a system or a phenomenon that is worked against. In real life, they could not do all these things, whereas in the layered-reality there is a place for experimentation and permission (Flanagan, 2009). Moreover, it is important to mention that subversion is a creative act rather than a destructive one (Flanagan, 2009), as proven in The Beast with critical thinking for example.

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[25] (fig. 2) in Chapter 1 Background of the study

[26] If a parallel were to be made with films, immersive games could be compared to mockumentaries.

In regards to Cow Clicker, Bogost made it clear that it was created for the sole purpose of demonstrating the four issues of social games: enframing, compulsion, optionalism and destroyed time (Alexander, 2010b; Bogost, 2010). Consequently, Cow Clicker encompasses all of the four in its design and gameplay: enframing by encouraging the participant to use her online friends to get more points (by inviting them to the game and by clicking on her cows) in order to get a higher place in the total ranking, compulsion through constant reminders in the form of Facebook notifications to re-connect, to engage, to update, to share, optionalism by giving the option to buy mooney (in-game money) in order to get more cows, 'better' cows (that will get the participant more points) or to by-pass the time-restrictions for clicking. Finally, in Cow Clicker time is destroyed as the goal of the game is infinite, the time spent playing by the participant is just plain void and represent time she could have used to do something more constructive. Therefore, the game objective was never to be fun, it was actually created to be a painful experience that was supposed to be short, to make the participant come to the realization that these kinds of Games exploit her and her entourage (Tanz, 2011).

Besides, in terms of Cow Clicker purpose, Lindsay Grace (2014) remarks that humor can act as a critique too when used as a satire (of incremental games and social games) like it is the case in Cow Clicker, which makes it thus a PR game, which is apart of critical games.[27] These types of games work according to two modes: social critique or mechanical critique. Regarding the use of satire, Cow Clicker leans more towards mechanical critique as it is embedded in the game mechanics hence it is said that Cow Clicker is recursive (Grace, 2014).

Cow Clicker as a PR Game bears some values and arguments about real life situations and humanity through models and representations (Bogost, 2008; Frasca, 2001, as cited in Woods, 2007): capitalism (profit, growth, property and the race for resources), diktat of instantaneity, alienation, etc. The game design of Cow Clicker also explicitly communicates these values, presenting

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[27] (fig. 2) in Chapter 1 Background of the study

an in-game economy as a pasture that needs to grow (Alharthi, Toups, Alsaedi, Tanenbaum & Hammer, 2018). Meaning-making in PR games is found by playing them: the participant explores the limitations of the magic circle (constraints and possibilities in the game made from the rules of the game), which enables her to read and understand these claims, to experience them through simulation and later to interpret them in the context of her ordinary life (Dugan, 2006, as cited in Bogost, 2008). In order to interpret the procedural models of the game, participants bring to the game their own experiences, knowledge, emotions, memories, etc. and by experimenting the procedural models in the game, the participant's knowledge of these situations is challenged and brings her to question them (Bogost, 2010). In that sense, games based on PR are powerful tools for critical thinking.

The only constitutive rule in Cow Clicker is to just start playing Cow Clicker. The main skill rules of the game are to reach out to and share with online friends about the game as much as possible, and to buy mooney/pay for time-bypass. If the participants follow these two last rules, they can go further in the game quicker, if they do not follow these rules though, it will not prevent them from playing (Suits, 1978). As participants in Cow Clicker are submitted to the authority of the game through its rules, another possibility for them to create meaning is by making choices and taking decisions that will shape her exploration of the magic circle (Flanagan, 2009). Even in incremental games like Cow Clicker where there is a lack of choices & therefore consequences, the small decisions that the participant takes may not influence the game a lot yet it may affect still the participant's perception of it; these decisions can shape the participant's understanding of situations, scenarios and features presented to her (Maia de Araújo, 2017).

Cow Clicker may be a PR game but it operates according to an abusive gameplay: poor graphics, ultra repetitive, very pushy, confusing rules- and goals-wise, etc. The main objectives for the developers of social games are monetization and user growth, which makes these games services rather than products (Bogost, 2010; Tanz, 2011). As Cow Clicker mimics social games,

Bogost soon received offers to monetize it[28] (Alexander, 2010b). In regards to the four concerns about social games in general (enframing, compulsion, optionalism and destroyed time), it is clear that Cow Clicker exploits its participants but also encourages them to abuse others (sending numerous requests to their Facebook contacts to invite them to play so the participant can get more clicks) (Wilson, 2011). Actually, in abusive game designs the participant is trapped in her submissive position and she will not move from it because she deeply trusts that a game is fun. This interpretation demonstrates a blind obedience to the authority of Play (Vinckenbosch, 2017).

Though Bogost, just like any dedicated project developer, was himself too abused by the game: not only did he spent time crafting the game, he then watched the participants playing it, he listened to their feedback, he imagined changes and made enhancements (Bogost, 2010). As the number of participants grew, Bogost felt compelled to sustain the experience and started spending more hours than he should working on this specific project, to the point that he also felt like he was wasting his and his entourage's time (Tanz, 2011). Although this situation is not unique to Bogost and Cow Clicker, it shows in this case that both participants and Bogost experienced the game in the same way (painfully). Though Bogost himself observes: "the most perverse thing about it is that, in the end, it was a viable social game" (Alexander, 2010b).

What was supposed to be a short experience turned into a journey as even though participants seemed to get the satire of Cow Clicker, they actually perversely started enjoying playing it (Tanz, 2011). Some in fact took the irony very seriously as when hackers managed to find a way to maximize their clicks, other participants were outraged and started complaining, which led to the installation of a verification system to prevent cheating (Tanz, 2011). According to Bogost, one of the reasons participants enjoyed Cow Clicker is because they are still confused about what social games are and what can

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[28] The anecdote says that even Facebook HQ contacted him on the matter of Cow Clicker (Alexander, 2010b).

they bring into their life. Therefore, Cow Clicker as being a critique of these games, is a safe place for considering, discussing and reflecting about them (Alexander, 2010a; Alexander, 2010b). Another justification to explain the enjoyment of the audience for Cow Clicker is that video games in general are not made to be funny. Yet, people are keen for irony, especially nowadays, so they loved finding it in a Game and being given the opportunity to perform it (the participants were 'playing the game of irony' by sharing extensively on their Facebook walls that they were 'clicking a cow') (Bogost, 2010, as cited in Alexander, 2010a). A third argument favors creative and social experiences that people get from playing social games (Alexander, 2010b). Despite participants being 'trapped' in an abusive game design, they are still able to connect to each other, express creativity and make meaningful experiences out of it, inside the constraints of the game (Tanz, 2011). Lastly, McGonigal (2010, as cited in Tanz, 2011) argues that no matter how miserable a game is, if its mechanics (rules and design) are captivating enough, it will make any activity in the game rewarding with a feeling of accomplishment.

Co-creation

Stewart Woods (2007) suggests that in the case of multiplayer games like The Beast, the magic circle turns into a collaborative environment where various interpersonal exchanges happen. Elizabeth Bonsignore, Kari Kraus, June Ahn, Amanda Visconti, Ann Fraistat, and Allison Druin (2012) talk about the concepts of 'positive interdependence', which is the belief that the success of one is correlated to the success of the whole group and vice versa, and 'promotive interaction', that is sharing resources and constructive feedback amongst the members of the community to reach its common goals (Bonsignore, Kraus, Ahn, Visconti, Fraistat & Druin, 2012). In The Beast these two concepts are obviously present as the artist designers of the game declared that they purposefully made puzzles that could only be successfully solved collaboratively; participants had to do more than interacting with each other, they had to collaborate by pooling information and resources to solve the game puzzles (Fallon & Darvasi, 2017; McGonigal, 2003a; McGonigal, 2003b). What participants will learn in that magic circle and interpret in real life later will be the result of a shared understanding (Woods, 2007). Participants

together co-create the community they belong to, along with a culture of participation (Hook, 2016).

McGonigal (2003b) further argues that immersive games like The Beast have proven to generate a sense of social agency in participants and that team efforts in these games can lead to collective actions to work out real world problems. The game keeps on only through the collective effort of the members of its community. Actually, she notes that the most valuable outcome in immersive games is the collective intelligence created through the social dimension of play, rather than the game itself (McGonigal, 2003b; Hook, 2016). Participants "have become a part of the game, just as the game has become a part of them. They have become integrated, interacting and communicating" (McGonigal, 2003b, p. 8). This joint force enables the participants to fight authoritarian and oppressive systems (Levy, 2000, as cited in McGonigal, 2003b). Baz Kershaw even adds and identifies "aesthetic of total immersion as the most viable mode for collective empowerment" (1999, as cited in McGonigal, 2003b, p. 9). Therefore, it is valuable to note that a collaborative community is another great opportunity for meaning-making in The Beast.

More than co-creating a community, participants in The Beast are also the co-creators of the game itself and its meaning (Sicart, 2011). As a matter of fact, participants bring to the game their own experiences, knowledge, emotions, memories, etc. Consequently, The Beast is a reflection of the participant who takes part in it, as well as a social construct (Malaby, 2007; DeKoven, 1978, as cited in Zimmerman, 2003). Moreover, there is a process of co-authorship between participants and puppetmasters to create the game as for the feedback loop between the two that creates a flexible, open, and responsive narrative (Hook, 2016). Consequently, The Beast is "participatory, authorially collaborative, and open ended in its textuality" (Hook, 2016, p. 7). Another example of co-authorship in The Beast can be found in the consensus by the participants to 'fix' the ruptures in the game that are threatening the TINAG rhetoric, taking on the puppetmasters' job (McGonigal, 2003a).

Regarding Cow Clicker, participants playing the game co-create the community they belong to. As the gameplay of Cow Clicker does not provide a final goal, the ultimate outcome of the game is the final co-created community of participants. In fact, they reckon that they built strong relationships with each other thanks to the game, which led to discussions and reflections online about and through social gaming (Tanz, 2011), but also offline at games events for example, alimenting the current debate about social games versus traditional games.

As a PR game, Cow Clicker also acts as a catalyst for the participants' values and emotions that they all brought to the game (Bogost, 2008). Social critique is usually expressed through critical design and the game is said to be reflective. Therefore Cow Clicker as a critical game is engaged in both social critique and mechanical critique, traveling amidst the different parts of the spectrum (Grace, 2014). Jean Lave and Etienne Wenger (1991, as cited in Bogost, 2008) label it the 'community of practice', which is a community made from a social situation around which people collaborate to develop ideas and cultural values. Subsequently Bogost adds "video games are media where cultural values themselves can be represented - for critique, satire, education, or commentary" (2008, p. 119).

Relation to art

First and foremost, it is critical to note that The Beast, as pertaining to the genre of immersive games, comes from a legacy of various immersive art forms, such as Chinese rolls, panoramas, trompe-l'oeil, cinema, virtual reality installations, and many other artistic disciplines through the development of color, composition and material (Li & van der Veer, 2018; McGonigal, 2003b). From there, McGonigal (2003b) suggests that The Beast can be connected to representational arts (literature, painting, theater) as in order to receive any representational arts production, the audience needs to engage in a game of make-belief (Walton, 1993, as cited in McGonigal, 2003b). Thus ARGs simply make obvious what audiences in other art forms have always implicitly been doing.

Next, The Beast as an ARG can be associated with relational art. Nicolas Bourriaud (2002, as cited in Hook, 2016) argues that relational artworks are rooted in human relations and their social contexts, as opposed to the service-based economy. Actually, relational art privileges the relationships inside the audience over the art object, creating a punctual art practice (2002, as cited in Hook, 2016). Besides, both relational art and The Beast give their audience the means to create a community, which forms over shared experience and knowledge that are directly related to participation. Besides, Bourriaud states that relational art emphasizes audience engagement in a collegial, participatory manner (in opposition to shock tactics or provocation as seen in modernist avant-garde practices) (2002, as cited in Holt, 2015). Moreover, relational art, just like The Beast, creates a mixed narrative and mixed aesthetic encounter through immersion by using an 'interfaceless interface'; both try to erase the medium so the audience has a direct relationship with its content (Hook, 2016; McGonigal, 2003a). Therefore, just like The Beast, relational artworks are collective, authorially co-created, and open ended (Hook, 2016).

Moreover, The Beast can be linked to participatory design, which is a hybrid of art and design (Holt, 2015). Similarly to relational art, participatory design requires participation from the audience in the co-creation of meaning. Just like the PR reading of The Beast demonstrated, the goal of participatory design is to address the 'life-world' of the participant (Sanders & Stappers, 2008, as cited in Holt, 2015). Participatory design focuses on the creation of an experience, rather than an object, and the final realization is durational, dialogical and collaborative. Participatory design therefore tends to foster a sense of public responsibility, a feature that is also present in The Beast as the participants are responsible for their freedom to play (as their own immersive experience). Moreover, in both participatory design and The Beast, participants are involved in the creation process from beginning to end rather than simply enjoying the final outcome of it (Holt, 2015).

Furthermore, another parallel can be made with Umberto Eco and his concept of 'work in movement' characterized by incomplete structural units (1989, as

cited in Hook, 2016). In The Beast, these sparse units are the bits of the narrative that are hidden in the different communication channels used in the game (digital and non-digital). As The Beast story was not designed in a sequential order, these units can make the story evolve in different ways and hence allow the participants to influence it. In that sense, The Beast is considered an open work, which enables an authorial dialogue between the audience and the puppetmasters.

Lastly, even though The Beast relates to several artistic aesthetics, within the field of interactive art it belongs to the strategy of game (Kluszczynski, 2010). This strategy is based on interaction whereas the audience has to make decisions through certain actions (like challenges, tasks and sometimes qualifications) that will have consequences in the game journey. Participants have at their disposal rules and tools provided by a limited space in the game. As mentioned before, in The Beast it is the TINAG rhetoric that brings the participants to make meaningful choices inside the magic circle: it incites critical thinking, counterfactual thinking, information literacy practices, creativity, as well as collaboration and resilience. Finally, according to the strategy of game, artwork-events like The Beast that make the game transform along its journey, create meaning through subversion (Kluszczynski, 2010).

Kluszczynski (2010) also argues that two characteristics discern strategy of game from common usual games: first strategy of game is meta-discursive, the attention is focused on interaction, how it is structured and the discourses involved in the event. This meta-discursiveness is what makes possible to debate about playing, the game and the game world. In The beast it translates once again through the TINAG rhetoric, yet also through co-creation in authorship and community building. Secondly, strategy of game makes the game itself a method to understand issues non-related to the game, which happens in The Beast as participants are practicing real life for the real life, and therefore are able to tackle real life issues since they approached them in the game before.

Concerning Cow Clicker, first of all as a social game and incremental game (clicker Game) it belongs to the broader category of video games. Espen Aarseth (2003) argues that video games host non-ephemeral content since every piece of data is stored. Thus data in video games is made visible for the participant in a way that it was not before in other artistic forms. This is also closely related to the concept of video games exceptionalism that states that there is a difference between playing digital games and other forms of Play as video games are often said to be interactive, meaning that they allow participants to experience an instantaneous feedback loop with the technological device on which they operate (Aarseth, 2003; Fassone, 2014; Maia de Araújo, 2017). Therefore, not only are video games an art form, it is also an art field of its own.

Besides, Cow Clicker as shown earlier in this chapter, can be analyzed trough a PR approach, which demonstrates that it may create meaningful co-created experiences for its participants. Therefore, Cow Clicker as a PR game enters the broader category of serious games, which differentiates it from basic playful interaction.[29] Subsequently, Bogost stresses that serious games are serious matters that have a place as a mean for education in schools, just like art (Bogost, 2008). Bogost himself describes Cow Clicker as a blend of theory and art as it distills the social game genre down to its essence (Alexander, 2010a; Bogost, 2010, as cited in Alexander, 2010b).

Finally, Bogost observes that Cow Clicker can nonetheless be considered as bad art. Yet, its detractors cannot ignore the genre popularity and that it is a reflection of the current society (Bogost, 2010). In fact, Cow Clicker problematizes some aspects of the genre that it belongs to, it rejects the object-like character, creates a space for social bonding, and it offers a context for critical thinking and co-creation. In that sense, Cow Clicker can be associated with conceptual art (Kluszczynski, 2013). Actually, Zafer Bilda (2011, as cited in Edmonds, 2014) notes that when engaging with art, participants eventually get to a deep understanding of the artwork-event and

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[29] (fig. 3) in Chapter I Background of the Study

start evaluating at a conceptual level, which brings them to understand new features about the work that went unnoticed before. In Cow Clicker as in any PR games, participants discover the meaning of the game (satire, critique and art) by playing, which gives them the ability to read and understand its claims, experience them through simulation and later interpret them in their ordinary life.

Cross-case report: results

The above analysis has revealed that The Beast is considered a game (as play structured by rules, goals and competition) (Caillois, 2001, as cited in Deterding, Dixon, Khaled & Nacke, 2011) with one main constitutive rule that is for the participants and the puppetmasters to maintain the wizard's curtain that stands between them (Hook, 2016; Suits, 1978). As a matter of fact, this very wizard's curtain leads the audience to perform belief, which sets the limits of the magic circle as a possibility space in The Beast (McGonigal, 2003a).

Regarding meaning-making in The Beast, the TINAG rhetoric educates the participants to critical thinking, counterfactual thinking, information literacy practices creativity, and collaboration and resilience (Fallon & Darvasi, 2017; Jenkins et al., 2006, Johnson et al., 2010, Whitton, 2008, all as cited in Bonsignore, Kraus, Ahn, Visconti, Fraistat & Druin, 2012). From a PR approach, the analysis has also shown that participants in The Beast are practicing real life for the real life, which creates a projected desire promoted once again by the TINAG philosophy. Besides, it has also been discovered that The Beast qualifies for abusive game designs (Wilson, 2011; Wilson & Sicart, 2010) under the category of immersive games (Wilson, 2011; Wilson & Sicart, 2010), which by using subversion generates a layered-reality as a place for experimentation and permission (Flanagan, 2009). Finally, in The Beast the participant is responsible for her own immersive experience and for her freedom of playing (Leino, 2014; McGonigal, 2003a).

In The Beast participants co-create the community they belong to, as well as a culture of collaboration and participation (Hook, 2016). Hence the most

valuable outcome of meaning-making taking place in the magic circle of The Beast is collective intelligence, as the result of a shared understanding (Hook, 2016; McGonigal, 2003b; Woods, 2007). Moreover, as participants come to play as the real 'them', they bring to the game their own experience, dreams, and who they are, which makes The Beast a reflection of its participants and a social construct (Malaby, 2007; DeKoven, 1978, as cited in Zimmerman, 2003). Furthermore, The Beast as an immersive game creates collective empowerment to work out real world issues (McGonigal, 2003b) and to fight authoritarian and oppressive systems (Kershaw, 1999, Levy, 2000, both as cited in McGonigal, 2003b),

Co-creation in The Beast also occurs through co-authorship by maintaining the wizard's curtain, whereas participants consciously ignore the ruptures that expose The Beast gameness and actively protect the TINAG rhetoric, and the Puppetmasters craft a responsive narrative around the participants' gameplay (Hook, 2016).

The analysis shows that the obvious performed belief at the core of The Beast has actually been practiced implicitly since forever in representational arts (Walton, 1993, as cited in McGonigal, 2003b). Besides, The Beast presents some similarities with relational art as both situates community and participation at the forefront of their Art by using immersion through interfaceless interface (Hook, 2016; McGonigal, 2003a). The analysis also demonstrates the proximity of The Beast with participatory design, which centers its art on collaboration, co-creation and the experience of it rather than the end product (Holt, 2015). Additionally, the incomplete structural units of Eco's 'work in movement' (1989, as cited in Hook, 2016) can be compared to The Beast' hidden narrative clues that turn the game into an open work and allow a dialogue to happen between the audience and the puppetmasters. Finally, the analysis determines that The Beast belongs to the field of interactive art and the strategy of game because of its reliance of the TINAG rhetoric. It is also indicated that The Beast is not a mere game as it holds a meta-discursive dimension and can be used as a method to navigate real life (Kluszczynski, 2010; Kluszczynski, 2013).

Concerning Cow Clicker, it has been established that it is a game too, encompassing four main issues encountered in social games: enframing, compulsion, optionalism and destroyed time (Alexander, 2010b; Bogost, 2010). Subsequently, Cow Clicker operates according to an abusive gameplay exploiting the participant, her entourage and the developer himself.

The analysis has revealed that Cow Clicker is a repetitive, recursive and reflective PR game, using satire (of incremental games and social games) as mechanical critique (Grace, 2014). Meaning-making occurs according to the PR approach: by playing the game the participant explores the limitations of the magic circle (made by the constraints of the game), and therefore is able to read and understand the in-game real world arguments representations and models (capitalism, diktat of instantaneity, alienation), to experience them and to interpret them in real life, developing some critical thinking (Dugan, 2006, as cited in Bogost, 2008). Another way to achieve meaning-making in Cow Clicker is by making choices and taking decisions within the constraints of the game (Flanagan, 2009). Finally, the enjoyment of the participants in an experience that was made painful to them can be explained by several reasons: Cow Clicker as a satire is a safe place for considering, discussing and reflecting about games like Cow Clicker, participants are keen to performing satire, they are able to create meaningful creative and social experiences, and Cow Clicker game mechanics (rules and design) appear to be captivating enough that it makes the activity in the game rewarding with a feeling of accomplishment (Alexander 2010a; Alexander, 2010b; McGonigal, 2010, as cited in Tanz, 2011).

The co-creation of a community is the ultimate outcome of Cow Clicker, as its participants bond over the game. Therefore participants are also co-creators of the meta-discursive discourse about Cow Clicker as the game leads to discussions and reflections about social gaming and games in general. Moreover, participants in Cow Clicker also co-create a community of practice that is packed with participants' ideas and values, and that is made possible by social critique embedded in the design of the game (Lave & Wenger, 1991, as cited in Bogost, 2008; Grace, 2014).

The analysis demonstrates that Cow Clicker does belong to art as it fits the realm of video games, which is an art field of its own because of the data exposure displayed like in no other art forms before, and also because of the exceptionalism of video games that is legitimized by their instantaneous feedback loop (Aarseth, 2003; Fassone, 2014; Maia de Araújo, 2017). Moreover, Cow Clicker in video games belongs to the category of serious games, which are as serious as art or other domains in education. Serious games means that Cow Clicker is not just playful interaction, it has a meaningful purpose and creates meaningful experiences (as it is a PR game): it distills the social game genre down to its essence (Alexander, 2010a; Bogost, 2010, as cited in Alexander, 2010b). Lastly, the analysis determines that Cow Clicker share some similarities with conceptual art as it problematizes some aspects of the genre that it belongs to, it rejects the object-like character, it creates a space for social bonding, and it offers a context for critical thinking and co-creation (Kluszczynski, 2013). At some point in the game, participants get to a deep understanding of the artwork-event and this is when their play activity too gets conceptual (Bilda, 2011, as cited in Edmonds, 2014).

Conclusion

The above findings of the analysis determine that both The Beast and Cow Clicker do belong to art and consequently that both can be considered as art works and not just 'mercantile works'. It has also been established that both are games according to the definition followed by this research.

From there, the results of the analysis demonstrate the causal relation between playing games and co-creation in an artwork for both cases. In the case of The Beast, meaning-making directly derives from the TINAG rhetoric, which can happen only because of the constitutive rule of the wizard's curtain. Subsequently, it is demonstrated that it is meaning-making that allows collective intelligence and collective empowerment, two co-created results of the formed community of participants. Likewise, it is meaning-making that allows co-authorship in the TINAG rhetoric and in the narrative of the game, two other kinds of co-creations that take place in The Beast.

Then as well in Cow Clicker, it is the high level of constrain in the game that brings the participants to question the motivations of the artist designer, and therefore to unveil and understand the purpose of the game and the arguments it carries. Then participants bond over this meaningful collective experience, which leads to the creation of a community that share values and generate a meta-discursive debate.

Therefore, the results show that there are different stages from the action of playing a game to co-creation, yet all these phases are connected and indispensable to each other. Each stage is related to the previous one and cannot occur if the previous one did not take place.

H1: 'Playing a game' (X) fosters co-creation (Y) in an artwork-event.
In conclusion, returning to the initial hypothesis and in the light of the above findings of the analysis, the research finds that there is a positive correlation between X, being the causal factor of interest and Y, being the outcome of interest in both cases, even though The Beast and Cow Clicker are two different games, independent from each other. [30] Therefore, the initial hypothesis is confirmed: 'Playing a game' fosters co-creation in an artwork-event.

5.1.2 Within-case analysis: process tracing

Process tracing as mentioned before, examines the in-case development over time and in details (Collier, 1993), highlighting decision-making, judgments, perceptions, preferences, etc. (Collier, 1993; Levy, 2008). Therefore new information about the cases is discovered. Besides, process tracing comes complementing the comparative method (method of agreement, aka most-different case typology) ran previously in order to create a stronger basis for attributing causal significance to the relationship between X and Y (Alexander L, George & Bennett, 2004; Levy, 2008). In this section the author identifies all the observable (and available) implications of a theory, including both dependent and independent variables to the outcome Y.

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[30] Criteria checklist in Chapter 4 Data collection

Case 1

At the beginning of The Beast, Microsoft asked Warner Bros and Dreamworks to create a game in order to grow an audience's interest around the A.I Artificial Intelligence movie release (McGonigal, 2003b). Therefore, Sean Stewart (lead writer) and Elan Lee (Microsoft) were chosen to be the first Puppetmasters of the game and decided to create an ARG (Szulborski, 2005).

At the time, they drew out the first ideas of the conception of The Beast: 1) the narrative is pre-written and then broken up into fragments, which the audience must reassemble, 2) the narrative uses multiple communication channels in addition to the main platform, 3) the audience will have to work collectively, 4) the audience explores the story at the same time that they affect it, 5) and finally the use of the TINAG rhetoric (Stewart, 2006). Sticking to the codes of ARGs, the game never presented itself as such and no rules were edited. The puppetmasters also mentioned that they wanted The Beast to be like a work of art: creating emotions and making the audience want to engage with it (Szulborski, 2005).

In April 2001 The Beast was released with its two rabbit holes,[31] redirecting the participants to The Beast fictional web sites (Szulborski, 2005). The interactive trail designed by the puppetmasters was supposed to go as follow: the plot would be advancing with weekly updates that participants would have to crack collectively. As the audience had to pool their resources and work together, they spontaneously grouped under the Cloudmakers online platform (Szulborski, 2005). The puppetmasters of The Beast had planned a 3-month puzzle schedule, the exact time period between the launch of the game and the release of the movie. However they had underestimated the collective power of the participants' joint skills and knowledge, which allowed them to solve it all on the first day (McGonigal, 2003b). In response to this very efficient collective play, the puppetmasters decided to make the next puzzles harder by demanding even more cooperation from the participants, for

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[31] Chapter 4 Data collection

instance by organizing live events in different locations in the world that participants needed to attend at the same time (McGonigal, 2003b).

In addition to more complex puzzles, The Beast puppetmasters had to come up with new narrative paths, side stories, characters and online assets. As The Beast grew, it started to get more and more coverage, from the online specialized press, to international high-profile newspapers (McGonigal, 2003b). Along The Beast journey, puppetmasters also had to deal with discrepancies and breaches in the TINAG rhetoric, that were conveniently overlooked by the participants thanks to their ability to perform belief.

Eventually The Beast ended with the release of the A.I. movie, yet up to two months later, the producers still refused to acknowledge that it existed, sticking to the TINAG rhetoric, so characteristic of ARGs (McGonigal, 2003b).

Case report: results

The creation process of The Beast determines that it was always about making an ARG, even though it was commissioned for a marketing move. It also shows that it was decided from the beginning that The Beast would be highly immersive, co-created (socially and authorially), and a form of art.

Besides, process tracing reveals that co-created force is at the core of The Beast design. Actually, it turned out to be so powerful that it outdid the interactive trail the puppetmasters had planned. Moreover, process tracing points out that it is this co-created community that allows the game to keep running by performing belief when they face discrepancies or TINAG breaches.

Finally, the puppetmasters sticking to the TINAG rhetoric after the game is over actually showcases the ultimate evidence of the mightiness of the collectivity, by keeping the game going even when there is no more game to play.

Conclusion

H1: 'Playing a game' (X) fosters co-creation (Y) in an artwork-event.

In conclusion, returning to the initial hypothesis and in the light of the above results, process tracing in the case of The Beast tracks a causal relationship between X, being the causal factor of interest and Y, being the outcome of interest. Therefore, it comes complementing the comparative method conclusions by also confirming the initial hypothesis: 'Playing a game' fosters co-creation in an artwork-event.

Case 2

The past decade there has been a split in the game world between traditional games and social games. Bogost as a game critique engaged in some heated debates on the topic, which caused one of his colleague, Raph Koster, to challenge him to try himself to make a social game before being so critical about it (Alexander, 2010b). Later, as Bogost was invited to the NYU Game Theory event on July 2010, rather than giving a presentation about games, he came up with the idea of making the audience play a game that would illustrate his concerns and therefore put theory into practice and make it playable (Bogost, 2010; Tanz, 2011). Cow Clicker was born.

Therefore, Cow Clicker distills social games to its essence, embodying their worst aspects according to Bogost: enframing, compulsion, optionalism, and destroyed time (Bogost, 2010). By making an abusive satire Bogost thought that the participants would realize how absurd the game was and stop playing it. However, even though the majority of the participants understood the critique behind the game, they kept playing it (Alexander, 2010b). Actually participants found it enjoyable and appealing because as a satire it gave them a space to reflect on this game genre that they are still confused about (Alexander, 2010a; Alexander, 2010b). Also, Cow Clicker allowed participants to perform irony, which is unusual in video games (Bogost, 2010, as cited in Alexander, 2010a). Moreover, participants reckoned they were able to be creative within the game constraints and to build meaningful relationships with each other (Alexander, 2010b; Tanz, 2011). Lastly, Cow Clicker rules and design were captivating enough that it made the participants feel like they

were accomplishing something by playing it (McGonigal, 2010, as cited in Tanz, 2011).

Hence Cow Clicker gained more and more participants and started attracting the press, which the combination of both made the game a hit (Tanz, 2011). Consequently, Bogost felt obligated to sustain and improve the game (Tanz, 2011). Cow Clicker was exploiting the participants by pushing them to publicize their actions on social media, to harass their friends to join, to keep the participants coming back with ruses and to force them to spend money and the developer too as Bogost spent countless hours observing the participants, listening to their feedback, and improving the game in response (Tanz, 2011; Alexander, 2010b).

As the game went on, it lost participants though secured fervent fans (Tanz, 2011). Cow Clicker community at the time was so strong and dedicated to the game that when hackers cracked it, Bogost had no choice than fortifying the security on participants' demand (Tanz, 2011). To keep the game interesting and go further in the satire Bogost created a series of spin-offs in the beginning of 2011, such as Cowclickification, Cow Clicker Connect, Cow Clicker API, Cow Clicker Moobile, My first Cow Clicker, Cow ClickARG, Cow Clicktivism (Bogost, 2010; Tanz, 2011).

Eventually, Bogost created the Cowpocalypse, a countdown turned into a game announcing the end of Cow Clicker. On September 7, 2011 Cow Clicker was over, yet still accessible. Since then, some participants still 'play' where there is no game (Tanz, 2011).

Case report: results

The process tracing of Cow Clicker reveals that initially the game was created with the sole purpose of demonstrating a theory about the negative aspects of social games (enframing, compulsion, optionalism, and destroyed time) by using satire as a mean for critique.

Surprisingly though participants started enjoying the social game for what it was, as Cow Clicker offered a safe space for meta-reflection, to perform irony in video games, to be creative and build relationships, and because the game mechanics in place felt rewarding. Consequently process tracing points out that Bogost's theory that social games as abusive products cannot create real meaningful experiences for the participants falls flat. Nonetheless, it does also highlight that even though participants were able to be resilient inside the constraints of the game, Cow Clicker was still an abusive game exploiting the participants, as well as its developer.

As the game progresses, process tracing shows that the created community of participants became tighter and their values stronger (defending the game), at the same time that Bogost's commitment to his project got deeper. Though once the game was done, some participants did not stop playing it, which demonstrates in the end how meaningful the game experience of Cow Clicker was.

Conclusion

H1: 'Playing a game' (X) fosters co-creation (Y) in an artwork-event.

In conclusion, returning to the initial hypothesis and in the light of the above results, process tracing in the case of Cow Clicker tracks a causal relationship between X, being the causal factor of interest and Y, being the outcome of interest. Therefore, it comes complementing the comparative method conclusions by also confirming the initial hypothesis: 'Playing a game' fosters co-creation in an artwork-event.

5.2. Analysis for hypothesis 2: cases 3 & 4

H2: Participant-centered approach in Gamified Interaction (X) is a necessary condition to the occurrence of a gamified artwork-event (Y).

The goal is to attempt to eliminate a causal factor, where X is the necessary variable and Y is the outcome of interest. This goal is represented under the formula $\not{X} \rightarrow Y$ (Gerring & Cojocaru, 2016). As a matter of fact, Bennett (2004) states that if the hypothesized necessary variable X to the occurrence of Y can be shown to have been absent in even a single case in which the outcome Y occurred, then it shows evidence that the variable X is not a necessary condition to the outcome Y.

- **Case 3:** Tweetris, 2011
- **Case 4:** BURP, 2004

5.2.1 Cross-case analysis/comparative method: method of agreement (aka most-different case typology)

In order to attempt to eliminate a causal factor (the hypothesized necessary variable X to the occurrence of Y), the author will deconstruct the hypothesis in two respective parts and analyze each of them separately in regards to the theory framework given by the literature review.

Participant-centered approach in Gamified Interaction

Before starting the comparative method of analysis for the two cases, the author reminds her own definition of Gamified Interaction: the deliberate application of Game Design elements to interaction (or interaction-passing reaction or tricked interaction) taking place between two parties (respectively a human audience and the other one being of digital nature), and from which will result an artwork-event. The implementation process is made according to the audience's personal expectations of a successful interaction (art) experience.

In regards to the above definition, it appears that a participant-centered approach is related to meaning-making. As mentioned before,[32] meaning-

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[32] Chapter 1 Background of the study

making in Gamified Interaction may happen by following the same recommendations that apply to meaningful gamification. First, the designer must look at the participants' intrinsic motivations (Paharia, 2012, as cited in Deterding, 2012; Nicholson, 2012a), which are related to three elements: mastery, which is learning and feeling confident about that knowledge (it can drive engagement as such as rewards are no longer needed), autonomy, which is the freedom of choice as well as with the feeling of control that Nicholson (2012a) also calls the self-determination theory, and finally relatedness, which is knowing other people do the same task (Deci & Ryan, 2004, as cited in Nicholson, 2012a). In Tweetris participants learn the rules of the game and how it works by playing it (mastery), they are free to decide how they will manage to fill the on-screen Tetromino silhouette whether by teaming up with other people or doing it alone and which position to give to their body (autonomy) (Reilly, Chevalier, & Freeman, 2014), they also know other people do the same activity if they are playing in a pair or if they were part of the audience as cheerer or observer (relatedness) (Reilly, Chevalier, & Freeman, 2014).

On the self-determination theory, Edward Deci, Richard Koestner and Richard Ryan (2001, as cited in Nicholson, 2012b) found a positive correlation between choosing to do a certain action and the internal motivation to do it, this choice allows the participant to have the power in her hands (Nicholson, 2012a). Actually, Bilda (2011, as cited in Edmonds, 2014) posits that once someone becomes familiar with a system, the spontaneous actions from the beginning become gradually deliberate actions driven by intentions. For instance in Tweetris, as the participant gets to know the rules of the game by interacting with it, she starts playing by trial and error. She then learns that for each correctly reproduced Tetromino, the system reaction is to fill out the on-screen silhouette with the her assigned color, next to fill out the scoring bar on top of the screen which gives the participant a point and finally to present a new Tetromino (Reilly, Chevalier, & Freeman, 2014). Once the participant is familiar with the functioning of the installation, she does not work according to trial and error anymore, rather she has gained confidence and adjusts her own responses accordingly, in order to increase her control over the game.

83

In another study, Deci and Ryan (2004, as cited in Nicholson, 2012a) continue by suggesting that participants with intrinsic motivations are more likely to enjoy the activity they take part in than if they had done it for extrinsic motivations. Play, as an intrinsic motivation, enables the participant to enter ludic learning spaces where she finds meaning by exploring the gamification space as she reflects on it and interprets her findings according to her real life experience (Nicholson, 2012a; Kolb & Kolb, 2010, as cited in Nicholson, 2012b). Subsequently, choosing to do a particular action because it seems 'fun' has proven to enhance learning capacities and meaningfulness (Brown, 2009, as cited in Nicholson, 2012b). Therefore, the activity of playing the live Tweetris game is the reward, not the achievement (Paharia, 2012, as cited in Deterding, 2012).

On another note, the situational relevance theory explains that each person finds different things to be relevant (Schamber, 1994, as cited in Nicholson, 2012b). As each individual is unique, gamification needs to be user-centered so that everyone can find in there something meaningful to them (Nicholson, 2012b). As a matter of fact in Tweetris the audience can choose how they want to participate in the artwork-event: they can either decide to cooperate or to sabotage each other, they can compete in teams or play alone, and counters can be ignored if participants want to play casually rather than competing. As part of the public, the exhibition attendees can decide to encourage people playing or just to observe them (Freeman, LaPierre, Chevalier, & Reilly, 2013; Reilly, Chevalier, & Freeman, 2014). As mentioned earlier, participants may find Tweetris enjoyable for different reasons, that can be linked to performance or fame: participants perform for themselves, for the audience directly observing the Tweetris art installation, for Twitter users, for the gamers of the online custom Tetris or for the public outside the exhibition place (Freeman, LaPierre, Chevalier, & Reilly, 2013; Reilly, Chevalier, & Freeman, 2014).

Finally, another way to achieve meaningful gamification is to be part of a real community by encouraging collaborative work (Paharia, 2012, as cited in Deterding, 2012). Avinoam Baruch, Andrew May and Dapeng Yu (2016)

found that many participants in gamification activities actually consider cooperation to be more important than competition. Besides, participants can create transformative opportunities through participatory activities by engaging in the play space physically and emotionally with elements that do not belong to the game (Nicholson, 2012b). For instance in Tweetris people bonded over the game by laughing together, cheating, discussing it, talking about other participants, or just capturing some of the game moments on their own mobile phones (Reilly, Chevalier, & Freeman, 2014). Further in participatory engagement can the creators of the gamification space invite participants to become designers (Nicholson, 2012b) as it happens in Tweetris with the online custom Tetris, which shapes are made of the participants' faces. In that regard, gamification is fundamentally humanistic (Nicholson, 2012b).

Regarding gamified entities, as mentioned earlier in this study,[33] Deterding (2012) notes that they are systems built with a specific intention from the artist designer to include only some elements of game design, in that sense they are not 'games proper' even though participants consider them as such. In Tweetris the artist designers included elements of game interface design patterns like the scoring progress bar, of game design patterns and mechanics such as time constraints (hold the pose for at least two seconds and both participants must recreate the Tetromino within ten seconds), and finally of game design principles and heuristics with the free possibility for participants to compete against, collaborate with or sabotage each other (Deterding, 2012). Structure-wise, Benedikt Morschheuser, Karl Werder, Juho Hamari and Julian Abe (2017) found that game design should follow an iterative process and be user-centered, which is the case in Tweetris as the installation is based on WBI (Freeman, LaPierre, Chevalier, & Reilly 2013). Therefore, Tweetris sets itself apart from other games-related productions (serious games, full-fledged games, pervasive games, simulation, etc.) as the artist designers intentionally included game design elements and because the participants experience it as 'playing a game' (Deterding, 2012).

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[33] Chapter 1 Background of the study

Concerning the case of BURP, it qualifies as a straightforward (Andro and Saleh, 2015) co-created (Bonney et al., 2009, as cited in Aristeidou, Scanlon & Sharples, 2017) crowdprocessing (Morschheuser, Hamari, Koivisto and Maedchen, 2017) distributed intelligence/human computation (Haklay, 2013, as cited in Aristeidou, Scanlon & Sharples, 2017) system offering VCPs. In this definition, BURP is the digital system that allows participants to co-create 3D rendered animations (as VCPs) as the final artwork-event, by running the platform BOINC on their own computer.

Maria Aristeidou, Eileen Scanlon and Mike Sharples (2017) argue that VCPs are directly depending on citizens' engagement and contribution, which makes BURP highly participant-centered. Therefore, understanding the participants' motivations is crucial in VCPs. However, there are several barriers to the audience's engagement in VCPs like BURP, mainly being the lack of awareness regarding these digital systems, the lack of interest in 3D rendered animations, the lack of technical knowledge related to the use of BOINC and the limited targeted demographics (Aristeidou, Scanlon & Sharples, 2017). Therefore, in order to attract, engage and retain participants, VCPs must promote intrinsic motivations to allow meaning-making (Aristeidou, Scanlon & Sharples, 2017; Baruch, May & Yu, 2016; Darch & Carusi, 2010).

Nancy Eisenberg and Paul Henry Mussen (1989, as cited in Baruch, May & Yu, 2016) observe that motivations to participate in VCPs are almost always intrinsic and called 'prosocial', which means the genuine and free execution of actions in order to help another. In BURP, the intrinsic motivations could be of altruism if the participant genuinely wants to help others with rendering their project, of egoism if she really wants her own project to come to life so she will take part in BURP only to submit it, of collectivism if she wants to improve her team recognition or of principlism if she believes she participates in BURP for the sake of Art for instance (Baruch, May & Yu, 2016).

As mentioned before, intrinsic motivations are characterized by three elements: mastery, autonomy and relatedness (Deci & Ryan, 2004, as cited in

Nicholson, 2012a). The mastery criteria in BURP is reached through clear rules, a get started guide and BURP 'open by design' architecture that makes knowledge about the system itself and the different VCPs highly accessible (RenderfarmFi, 2010). Autonomy in BURP is also present as participants can decide at anytime to start or to stop donating to a VCP, or even to delete the BOINC platform that grants them access to the VCPs offered by BURP. Finally, they are aware of the many other volunteers just like them that do the same work thanks to the BURP community forum, its leaderboard and the VCP progress bar disclosed in BOINC.

Another way to increase participants' intrinsic motivations in regards to VCPs is to incorporate casual gaming in the form of Gamification (Aristeidou, Scanlon & Sharples, 2017). In BURP there are cooperative, individualistic and competitive gamification affordances such as virtual teams, shared goals, achievements, points as a reward for the quantity of fulfilled tasks, and leaderboards to incite competitive engagement (Morschheuser, Riar, Hamari & Maedche, 2017).

Actually the use of cooperative gamification features in VCPs has proven to promote collaborative behaviors in real life (Morschheuser, Riar, Hamari & Maedche, 2017). Indeed, gamification is very effective at generating we-intentions, which refers to true cooperation induced by collective intentions, not only the sum of each of them (Searle, 1990, Tuomela, 2000, both as cited in Morschheuser, Riar, Hamari & Maedche, 2017). Consequently, collaboration in VCPs leads to a sense of shared responsibility amongst the participants, and a feeling of belonging and community (Aristeidou, Scanlon & Sharples, 2017). In BURP indeed the participant collaborates in her team with other volunteers around the world, and at the same time she is collaborating on the VCP. Other social features encountered in VCPs include the maintenance of an ongoing feedback between the participants and the artist designer, as well as the involvement of the participants in the management process of the platform (Baruch, May & Yu, 2016). In BURP, the forum is a dialogical platform for the participants to interact with each others and with the artist designer. Besides, participants are invited to join in the writing of BURP

code (RenderfarmFi, 2010), which makes BURP a true people-powered system.

Regarding the application of gamification affordances to VCPs, the mechanics of the game should be very limited (strict rules) for it to be run smoothly, yet they do not have to be very elaborated if dynamics (run-time behavior) and aesthetics ('look and feel') are done properly (Cusack, Martens & Mutreja, 2006). Though in the context of BURP the rules are indeed very clear, there is no existence of any specific time pressure or theme/narrative. Actually, in crowdprocessing VCPs, a simple form of gamification is preferred because participants' contributions are seen as identical in terms of quality and creativity, and thus valued equally. True gamified systems only happen in VCPs that benefit from heterogeneous contributions (Morschheuser, Riar, Hamari & Maedche, 2017).

Artwork-event

First and foremost, in interactive art the artwork is an event that the audience can take part in, through interactive activities. Only with the audience's participation is the artwork-event complete (Kluszczynski, 2013). As mentioned in the previous chapter, in Tweetris the final artwork-event is the whole set of co-created performances: the live Tweetris game, the pictures thread of the live Tweetris game on Twitter, the online custom Tetris and the projected live Tweetris game outside the exhibition place.

Within interactive art, Tweetris belongs to the field of installation art as both share some common characteristics like the ephemerality of the artwork-event, semanticity with meaning-making allowing the installation to become the participant's production, and relationality as once the exhibition attendee enters the interactive environment it becomes one of its components (pro-interactivity) (Kluszczynski, 2013).

As for the implementation of interactive art, Tweetris fits two strategies proposed by Kluszczynski (2010): the strategy of instrument and the strategy of network. At the core of strategy of instrument is the interface in the form of

a digital device that generates visual or audiovisual events (Kluszczynski, 2010). In Tweetris, that interface is the Tweetris art installation, which participants interact with to create the final artwork-event. Regarding the strategy of network, relationships are primary (Kluszczynski, 2010); In Tweetris, participants are bonding over the different performances of the final artwork-event and, as a result, a network of relationships is built (Reilly, Chevalier, & Freeman, 2014). Therefore, in strategy of network interactivity takes the form of cultural participation. Besides, a main characteristic of strategy of network is that the artwork-event takes place in public spaces, where it entangles with bigger political contexts (Kluszczynski, 2010). As a matter of fact, Tweetris lies at the intersection of art, sciences (research) and technology, which makes it a hybrid art production aimed at community (Kluszczynski, 2010; OCADU, 2012).

Nonetheless, elsewhere in this paper[34] the author pointed out that interactivity in art can be real, yet it can also be mere reactivity or tricked interactivity perceived by the public as real interactivity. The participant may think she has a direct influence on the artwork even though she actually does not (Maia de Araújo, 2017). Participation in art though is a real process of co-creation, the artwork-artifact becomes an artwork-event and reacts or adapts to the social environment it is embedded in (Hu et al., 2013; Kluszczynski, 2013). Hence participatory art allows a high degree of participant-contributed content, which gives her some space for meaningful creative agency (Hu et al., 2013; Lüneburg, 2017).

As demonstrated earlier, Tweetris as a participatory production is at the same time social and political. Chloe Morley (2013) further argues that these art forms collapse boundaries between private and public spaces, and between the artist designer and the audience. To achieve the latter, collaboration between artist designers and participants is required, which leads to authorship questions (Morley, 2013). In Tweetris indeed, the live Tweetris game may run by itself in the background, yet it needs participants to interact

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[34] Chapter 1 Background of the study

with it in order to create all the performances that form the final artwork-event (Reilly, Chevalier, & Freeman, 2014). Consequently, in Tweetris participants interact with the art installation but they also become performers, executors, and co-authors in the creation and completion of the final artwork-event (Kluszczynski, 2010; Morley, 2013).

Actually, participatory art is fundamentally social, no matter the level of engagement (ranging from passive involvement, to mild interaction, to total immersion), the final artwork-event is always modified by the participant's own individual perspective, culture, intentions and tastes, which enables meaning-making (Eco, 1989, as cited in Morley, 2013). In addition to Kluszczynski's definition of artwork-events in interactive art (2013), Hu et al. (2013) state that in participatory art the installation serves as a platform for social interactivity to contribute to the artwork-event, that could grow over time and over distance thanks to technology, which is also one of participatory art main characteristic. In Tweetris the remotely projected the live Tweetris game outside of the exhibition space is an example of the artwork-event growing over distance. Actually, participation may even carry on after the physical art experience has taken place, since nowadays digital technologies (Internet and mobile phones) allow anyone to capture and to replay or transmit it afterwards (Morley, 2013). In this regard, the artist designers, the audience, the participants and the art installation are all active actors in the performance eco-system that form the final artwork-event (Gurevich, 2007, as cited in Lüneburg, 2017), from which emerges meaning-making.

As mentioned before, in BURP the artwork-event is the co-created 3D rendered animation (VCP). On one hand, this final production may be considered as part of the service-based economy as it is ephemeral and closed, not presenting any opportunities for meta-discussions or reflections around VCPs (Bourriaud, 2002, as cited in Hook, 2016; Kluszczynski, 2010). In this regard, volunteers in the creation process are considered as mere resources and, as a result, the final work is not a reflection of them. In fact, In BURP the attention is focused on the tasks to achieve, more than on

interaction and it seems to privilege the end product, rather than the (social) experience leading to its realization (Holt, 2015; Kluszczynski, 2010).

On the other hand though, the mercantile dimension of the final work in BURP does not take away the fact that 3D rendered animations are still art productions. As a matter of fact, even though participants are not involved in the creative process of the work, it is still authorially co-created: if there is no volunteers involved, the artwork will literally never be finished (Hook, 2016; Kluszczynski, 2013). Moreover, BURP is an interactive system because of its digital nature that entails an instantaneous feedback loop with its participants (Aarseth, 2003; Fassone, 2014; Maia de Araújo, 2017). Therefore BURP does create art forms. Besides, it can be argued that the 3D rendered animations co-created thanks to BURP are indeed a reflection of the current art market and economy (Bogost, 2010), which makes BURP co-created artwork-events conceptual. Consequently, BURP as an interactive system just like Tweetris, uses the strategy of instrument as it produces an audiovisual artwork-event co-created by the participants (Kluszczynski, 2010).

Cross-case report: results

The analysis demonstrates that meaning-making in Tweetris is directly related to the participant's intrinsic motivations. First of all, play as an intrinsic motivation in Tweetris allows the participant to enter a ludic learning space, a sort of magic circle to which she brings her own individual perspectives, culture, intentions and tastes, that helps her understand what she experienced in the live Tweetris game and to interpret it in her real life (Eco, 1989, as cited in Morley, 2013; Nicholson, 2012a; Brown, 2009, as cited in Nicholson, 2012b; Kolb & Kolb, 2010, as cited in Nicholson, 2012b). This knowledge confidence brings to the participant a feeling of control (Bilda, 2011, as cited in Edmonds, 2014).

Next the analysis reveals that freedom of choice is another of the participants' intrinsic motivations in Tweetris. In fact, as each participant is unique, they will find different things to be meaningful. Therefore, Tweetris gives them the opportunity to decide how and why they engage with the art installation

(Freeman, LaPierre, Chevalier, & Reilly, 2013; Reilly, Chevalier, & Freeman, 2014; Schamber, 1994, as cited in Nicholson, 2012b; Reilly, Chevalier, & Freeman, 2014). Making meaningful choices about her gameplay within the constraints of the game increases the participant's feeling of control over it.

Moreover, the analysis establishes that collaboration is also a great intrinsic motivation in Tweetris (Paharia, 2012, as cited in Deterding, 2012), whether it is with other participants by bonding over the game to form a community, or with the artist designers in the production of the online Tetris game (Nicholson, 2012b; Reilly, Chevalier, & Freeman, 2014). Therefore, as Tweetris enables social and authorial collaboration, from which emerges meaningfulness, the analysis demonstrates that Tweetris is not only an interactive installation, but also a participatory art form (Morley, 2013). Besides, the live Tweetris game may run by itself, yet it needs the participant to interact with it in order to create all the performances that form the final artwork-event (Reilly, Chevalier, & Freeman, 2014). Therefore, participants in Tweetris are performers, executors, and co-authors in the creation and completion of the performance eco-system that forms the final artwork-event (Kluszczynski, 2010; Gurevich, 2007, as cited in Lüneburg, 2017; Morley, 2013). Consequently Tweetris is as a much of a production of the participant, that she is a part of it (Hu et al., 2013; Kluszczynski, 2013; Lüneburg, 2017).

Finally, the analysis reveals that Tweetris does introduce Gamified Interaction, as the artist designers included some elements of game design (gamification affordances) and the participant experiences it as if she were 'playing a game' with the Tweetris art installation (Deterding, 2012). Additionally, its structure is iterative and it is based on WBI, which places the focus of the art installation on the participant (Freeman, LaPierre, Chevalier & Reilly, 2013; Morschheuser, Werder, Hamari & Abe, 2017).

Concerning BURP, the analysis points out that it is highly related to citizens' engagement and contribution and therefore it must promote intrinsic motivations to create meaningfulness in order to attract, engage and retain participants (Aristeidou, Scanlon & Sharples, 2017; Baruch, May & Yu, 2016;

Darch & Carusi, 2010). The analysis also reveals that the initial motivations for taking part in BURP are prosocial (Eisenberg & Mussen, 1989, as cited in Baruch, May & Yu, 2016).

Moreover the analysis shows that gamification increases participants' intrinsic motivations (Aristeidou, Scanlon & Sharples, 2017). As a matter of fact, BURP uses a mix of cooperative, individualistic and competitive gamification affordances (Morschheuser, Riar, Hamari & Maedche, 2017). On one hand the cooperative gamification features in BURP generate social collaboration as the participant cooperates with the other members of her team or she competes against others. She also maintains an ongoing feedback with the other participants and the artist designer through the BURP forum that acts as a dialogical platform. Therefore, she knows there are other volunteers in BURP that are doing the same thing as she does and that she can relate to (Deci & Ryan, 2004, as cited in Nicholson, 2012a). On the other hand, cooperative gamification features also produce authorial collaboration as the participant co-creates the final artwork-event and BURP code (Bonney et al., 2009, as cited in Aristeidou, Scanlon & Sharples, 201; Baruch, May & Yu, 2016). In this regard, BURP is a true people-powered system.

Furthermore the analysis remarks that even though the co-created 3D rendered animation in BURP can be considered a product of the service-based economy with no focus on the social or creative process (Holt, 2015; Kluszczynski, 2010), it is nonetheless an art form as it can only be complete with the participation of the user. Besides, it can even be considered to be conceptual, as it is a reflection of the art market and economy (Bogost, 2010; Hook, 2016). Therefore, BURP belongs to the field of interactive art by definition, but also because of its digital nature that allows a feedback loop with the participants (Aarseth, 2003; Fassone, 2014; Kluszczynski, 2013; Maia de Araújo, 2017).

However, the analysis also demonstrates that if BURP is interactive, yet it does not support Gamified Interaction. In fact, the participants do not perceive the interaction with BURP as if they were 'playing a game'. BURP as the

digital interface only presents some gamification affordances, though these are not applied to the interaction between the two parties.

Conclusion

The above findings of the analysis determine that both Tweetris and BURP use a participant-centered approach characterized by intrinsic motivations for meaning-making. In Tweetris it is made through play, freedom of choice and collaboration, which enables co-creation and therefore turns the participants into performers, executors and co-authors of the final artwork-event. The results also indicate that the interaction between the participants and the Tweetris art installation is deeply gamified as the artist designers intentionally included some elements of game design to it and as the participant experiences it as if she were 'playing a game'.

Therefore, in Tweetris the results of the analysis demonstrate the causal relationship between the participant-centered approach in Gamified Interaction and the occurrence of the artwork-event. Besides, the results show that the participant-approach is a necessary condition, since the artwork-event cannot be complete without the participant being apart of it.

Concerning BURP, the results of the analysis reveal that meaning-making is made through the use of a mix of gamification affordances (cooperative, individualistic and competitive), which leads to social and authorial collaboration, just like in the case of Tweetris. Therefore, the analysis demonstrates that the final co-created artwork-event as 3D rendered animations do belong to interactive art, first it is final only with the participation of the user and second because of the digital nature of BURP as a system. However, the results of the analysis determine that BURP does not support Gamified Interaction, since it only presents gamification affordances, without them to be applied to the interaction.

H2: Participant-centered approach in Gamified Interaction (X) is a necessary condition to the occurrence of a gamified artwork-event (Y).

In conclusion, returning to the initial hypothesis and in the light of the above findings of the analysis, the research finds that only in Case 3 a causal relationship between the hypothesized necessary variable X to the occurrence of Y can be established.

As the hypothesized necessary variable X to the occurrence of Y has been shown to have been absent in Case 4 in which the outcome Y occurred, it shows evidence that the variable X is not a necessary condition to the outcome Y and therefore the initial hypothesis is rejected.

5.2.2 Within-case analysis: process tracing

Case 3

First and foremost Tweetris is a collaborative project created for HCI research purposes between artists interested in the creative process and researchers studying interaction (Reilly, Chevalier, & Freeman, 2014). The initial motivation behind the Tweetris exhibition was to increase the visibility of a new department at a new faculty group at the Art and Design University OCADU (Reilly, Chevalier, & Freeman, 2014).

As the project was carrying on, it was established that a study would be conducted in parallel to the exhibition, yet Tweetris remained a creative project first, therefore the research came second and should not influence it (Reilly, Chevalier, & Freeman, 2014). The objective of the research was to figure out the relationship between WBI/video-mediated communication over large displays, and collaborative play (Reilly, Chevalier, & Freeman, 2014). From there the artists and researchers invented a new form of interaction cue for WBI called the 'discretized silhouette' that they used in the Tweetris art installation (Freeman, LaPierre, Chevalier, & Reilly, 2013).

Tweetris evolved along the way: some concepts changed, the artist designers realized after the exhibition that the initial research questions could not be answered anymore, and some in-game modifications occurred in the next

exhibitions (Freeman, LaPierre, Chevalier, & Reilly, 2013). Tweetris took place in different venues, on different occasions: it was set up in a gallery and in a van at the Nuit Blanche in Toronto and at the Nocturne: Art at night festival in Halifax.

At the Nuit Blanche specifically, Tweetris proceeded as follows: the art installation is set up and running by itself in the background. The Nuit Blanche exhibition attendees then come to interact with it, making the live Tweetris game happen while the rest of the attendees are cheering them or just observing them playing. Participants too can watch themselves playing thanks to the Kinect device that records and projects the game. Meanwhile, pictures are taken of the fastest participant to make a successful Tetromino, then they are uploaded on a Twitter account set up for the event. Next, these same pictures are made playable in the custom online Tetris game that can be played at the time of the exhibition but also days after still. In the meantime, the live Tweetris game is projected onto a building outside the exhibition place to gain attention from an audience that is not attending the event (Freeman, LaPierre, Chevalier, & Reilly, 2013). It is valuable to note that in Tweetris participants are free to enter or exit the game space at anytime. Also, as the participant was engaging with the art installation, she was approached to sign a consent form. Afterwards, she had the opportunity to fill out a questionnaire to share her qualitative feedback (Freeman, LaPierre, Chevalier, & Reilly, 2013).

The study of the event included data collection (for each picture of a successful shape, the researchers recorded the installation location, the participant location, the execution time and the Tetromino), classification and analysis of the participants' strategies as design input for WBI (Freeman, LaPierre, Chevalier, & Reilly, 2013).

Case report: results

The process tracing of Tweetris reveals that from the very beginning, its objective has always been social and therefore participant-centered. From the set-up of the art installation, up to the research study it, the description of the

creation process clearly shows that every decision taken in Tweetris is made according to the participant.

Conclusion

H2: Participant-centered approach in Gamified Interaction (X) is a necessary condition to the occurrence of a gamified artwork-event (Y).

In conclusion, returning to the initial hypothesis and in the light of the above results, process tracing in the case of Tweetris establishes a causal relationship between the hypothesized necessary variable X to the occurrence of Y. Therefore, it comes complementing the comparative method conclusions about Case 3 by also confirming the initial hypothesis: Participant-centered approach in Gamified Interaction is a necessary condition to the occurrence of an artwork-event.

Case 4

BURP is a publicly distributed system for rendering 3D animations that launched in 2004. Its main objective is to make the rendering of 3D animations more accessible in terms of time and budget as these project are highly energy-demanding. In order to do so, BURP invites volunteers all over the world to pool their personal computing power so it can be used to co-create VCPs (Aristeidou, Scanlon & Sharples, 2017; Darch & Carusi, 2012).

The whole system in BURP is community-based as the projects are uploaded and co-created by the participants, all the files are open to everyone, BURP uses open source software such as BOINC and Blender and participants can also join in the writing of BURP code. Besides, the copyright always remains with the creator of the VCP (RenderfarmFi, 2011). BURP thus offers 3D rendered animations of professional quality that anyone can collaborate upon for free and the end result is free for watching for anyone too (RenderfarmFi, 2010).

All these computers working together form a 'render farm' that is accessible to anyone for free (RenderfarmFi, 2010). As commercial render farms are very expensive and therefore accessible by only a selected few, Kristensen next

came up with a distributed computing project similar to BURP called RenderFarm.fi (RenderfarmFi, 2011). Later, he developed the Open Rendering Environment (ORE).

Case report: results

The process tracing of BURP reveals that it is profoundly democratic, placing accessibility for everyone at its core. It is therefore highly participant-centered. Additionally, it highlights the link between collaboration and the 3D rendered animation (VCP). However, process tracing does not provide any information regarding gamification in BURP, as there was none to be found in the available sources gathered by the author. This lack of information may be evidence that Gamified Interaction does not occur in BURP.

Conclusion

H2: Participant-centered approach in Gamified Interaction (X) is a necessary condition to the occurrence of a gamified artwork-event (Y).

In conclusion, returning to the initial hypothesis and in the light of the above results, process tracing in the case of BURP cannot find a causal relationship between the hypothesized necessary variable X to the occurrence of Y. However, process tracing in the case of BURP shows that in the absence of the hypothesized necessary variable X, the outcome Y occurred still. Therefore, it comes complementing the comparative method conclusions about Case 4 that the variable X is not a necessary condition for the outcome Y and therefore the initial hypothesis is rejected.

5.3. Replication logic

H1: 'Playing a game' (X) fosters co-creation (Y) in an artwork-event.

The goal is to provide evidence of a causal relationship. Here X is the causal factor of interest and Y is the outcome of interest (Seawright & Cojocaru, 2011). This goal is represented under the formula X → Y (Gerring & Cojocaru, 2016).

- **Case 1:** The Beast, Microsoft, 2001
- **Case 2:** Cow Clicker, Ian Bogost, 2010

For the first case study presenting two cases, the author predicted that both cases would produce similar results, namely a literal replication. After analysis (method of agreement and process tracing) and returning to the initial proposition, all the cases turned out as predicted, therefore replication may be claimed for hypothesis 1.

H2: Participant-centered approach in Gamified Interaction (X) is a necessary condition to the occurrence of a gamified artwork-event (Y).

The goal is to attempt to eliminate a causal factor, where X is the necessary variable and Y is the outcome of interest (Gerring & Cojocaru, 2016). This goal is represented under the formula $\cancel{X} \rightarrow Y$. As a matter of fact, Bennett (2004) states that if the hypothesized necessary variable X to the occurrence of Y can be shown to have been absent in even a single case in which the outcome Y occurred, then it shows evidence that the variable X is not a necessary condition to the outcome Y.

- **Case 3:** Tweetris, Derek Reilly, Fanny Chevalier & Dustin Freeman, 2011
- **Case 4:** BURP, Janus Kristensen, 2004

For the second case study presenting two cases, the author predicted that the cases would produce divergent results for predictable reasons, namely a theoretical replication. After analysis (method of agreement and process tracing) and returning to the initial proposition, the two cases turned out as predicted with Case 4 diverging from Case 3 by failing to support an instance

of Gamified Interaction. Therefore replication may also be claimed for hypothesis 2.

5.4. Trust-worthiness checklist

As stated elsewhere in this study, Yin (1984) recommends using four tests to assess the quality of a case Study, respectively: construct validity, internal validity, external validity and reliability.[35]

First of all, the four cases of this study refer to a large variety of sources, of different nature and a chain of evidence was provided during the data collection phase encompassing the basic criteria for case studies, and specific criteria to the most-different typology of cases and to its exploratory version[36] (Gerring & Cojocaru, 2016; Seawright & Gerring, 2008). Therefore, the construct validity test is passed as the study compiles appropriate measures for the concepts being studied (Yin, 1984). Next, a cross-case analysis (method of agreement aka most-different case typology) has been executed and combined with a within-case analysis (process tracing). As both allow explanation building and determine causal relationships, the internal validity test is passed (Yin, 1984). Subsequently, external validity took place through the replication logic, which allows the generalization of the findings of this study (Yin, 1984). Lastly, if another investigator were to follow exactly the same procedures than the author chose to follow, she would arrive at the same results and conclusions because the author documented every single step of the present study in an extensive methodology as well as in a highly organized database.[37] This research has been conducted as if someone were auditing it, which is usually the case in a supervised master thesis (Yin, 1984). Hence this study also passes the reliability test.

In conclusion, as demonstrated right above, this study succeeded in meeting the expectations of the four quality tests proposed by Yin (1984). Therefore, it

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[35] (tab. 5) in Chapter 3 Methodology
[36] Chapter 4 Data collection
[37] Online on Dropbox

shows that the present case study research is of great quality and thus that the content and knowledge it produced are trust worthy.

CONCLUSIONS

The research question of this study "How does Gamified Interaction allow participants to co-create digital artworks?" encompasses three disciplines that are different, yet connected with each other: games (play, gamification and gamifying), HCI (VCPs) and interactive art. As a matter of fact, the literature review demonstrates that the three can be combined with each other and used as tools to increase participants' intrinsic motivations, which leads to the creation of meaningful experiences. Moreover, as the three disciplines appear to be deeply humanistic, the experiences created within their context must be participant-centered in order to incite collaboration.

Upon these revelations, the author came up with a unique definition of Gamified Interaction comprehended within the context of this study: the deliberate application of game design elements to interaction (or interaction-passing reaction or tricked interaction) taking place between two parties (respectively a human audience and the other one being of digital nature), and from which will result an artwork-event. The implementation process is made according to the audience's personal expectations of a successful interaction (art) experience. From there, two hypotheses have been formulated, respectively H1: 'Playing a game' (as the audience perceives Gamified Interaction) fosters co-creation in an artwork-event, and H2: Participant-centered approach in Gamified Interaction is a necessary condition to the occurrence of a gamified artwork-event. Later, cases have been carefully selected and an in-depth analysis has been conducted.

The results of the cross-case and the within-case analysis unanimously confirm the first hypothesis. However, for the second hypothesis, only the first case (Tweetris) fulfills the necessary condition, therefore H2 is rejected by the comparative method as well as the within-case method for the second case (BURP). In regards to the research question "How does Gamified Interaction allow participants to co-create digital artworks?", the analysis findings

demonstrate that Gamified Interaction plays an important role in the co-creation of digital artworks (H1 confirmed), though it does not necessary have to be designed according to the participant (H2 rejected). Moreover, Gamified Interaction appears to enable meaning-making, which incites personal development, and produces co-creation in the form of authorial and social collaboration. Finally, the analysis findings also suggest that in this causal chain, each step is mandatory and dependent on the previous one, which actually makes it a new necessary condition for the occurrence of an artwork-event.

Furthermore, these results generate new knowledge and content to the broader contexts of games, HCI and interactive art, in which this study operates. The findings of this study for a small number of cases are indeed significant since they can be replicated, which therefore allows the understanding of a much larger population of similar cases. In fact, the present study demonstrates the use of games to instigate authorial and social collaboration. It also endorses its authority as a field of its own right. Regarding HCI this research comes complementing the current publications in academia about the improvement of the quality of experience and engagement between the public and the machines through design. Finally, this master thesis is impactful for the field of interactive art as it shows not only that a user-centered approach is not a requirement to make the audience part of an artwork, but also that they are other ways to do so (for instance by gamifying interaction).

Limitations

A shortcoming of this study is that it is theory-based, rather than project-based and therefore there are a number of limitations mainly related to the methodology that need to be addressed. First, several comparative methods and within-case methods of analysis have been suggested,[38] yet the author chose to use only two of them (respectively the most-different case typology aka the method of agreement for the cross-case analysis and the process

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[38] Chapter 3 Methodology

tracing Method for the within-case analysis). Knowing that the more methods applied and cross-referencing each other increase the validity of the study, one can wonder the reasons for picking only a couple of them. Actually, for some of the methods presented in this study the author pointed out related weaknesses that had come up already in the current literature around them (structured focused comparison, congruence testing method, counterfactual analysis), which justifies that they are not used in this study. Besides, other methods proposed are predominantly made for large N analysis and are matters of Social Sciences or Political Sciences (qualitative comparative analysis and the method of fuzzy sets) and therefore are not the best fit for the present study. Nevertheless, the validity of this study is of great standard as it uses a comparative method, coupled with a within-case method of analysis, and it is secured through a combination of other means such as a replication logic and a trust-worthiness checklist (Yin, 1984).

Another limitation of this study regarding its chosen methodology is the issue of many variables, few cases (V > N) that happens when the researcher has more key criteria for the cases than the number of cases (Achen & Snidal, 1989, as cited in Bennett, 2004; Collier, 1993; Lijphart, 1975, as cited in Levy, 2008). Indeed in this study the author selected six theoretical criteria for analyzing four cases.[39] However, according to Yin (1984), as case studies do not follow a sampling logic, the sample size does not matter in this context. In addition, to overcome this issue, one of Lijphart suggestion is to focus on comparable cases only (1971, as cited in Collier, 1993), a recommendation that this study follows.

Another great worry related to comparisons among a small number of cases is the selection bias, which occurs when selecting on the dependent variable (Bennett, 2004; Barbara Geddes, as cited in Collier, 1993; Levy, 2008; Seawright & Gerring, 2008). However, according to Lijphart (1975, as cited in Levy, 2008), comparative methods impose control by selecting comparable cases, which can even be enhanced if the number of selections is small, as it

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[39] Chapter 4 Data collection

happens in this study. Moreover, some within-case methods of analysis such as process tracing (also used in this study) can offer a solution to the problem of selection bias, as it has its own inferential logic that does not involve comparisons (Levy, 2008).

Further in the cases selection, there are concerns related to the type of cases (most-different typology of cases, aka method of agreement) and the subcategory (exploratory version) the cases belong to. In fact, the method of agreement is usually seen as a weak tool for causal inference as it needs to fulfill specific conditions in order to work effectively (Mill, 1970, as cited in Bennett, 2004; Mill, 1843, 1872, as cited in Gerring & Cojocaru, 2016; Mill, 1970, as cited in Levy, 2008). Nevertheless, most-different cases that are broadly representative of the population they belong to are recognized for providing the strongest basis for generalization. Additionally, it is suggested that if the method of agreement is coupled up with the method of process tracing as it happens in this study, it compensates for its weaknesses (Mahoney, 1999, as cited in Bennett, 2004).

Finally, BURP in particular is not a very strong case, as it does not provide a lot of data and does not support Gamified Interaction, which is the main topic of this study. However, as this master thesis is realized as part of the course Media Arts Cultures, it needed to present cases related to art. Yet, very few are the VCPs that generate artistic productions. Actually, BURP is the only one the author could find. Moreover, the author made the personal choice to demonstrate two different replication logics, hence the study needed a case that could fit the theoretical replication, which means not supporting Gamified Interaction.

Future work

Further research is needed to continue to reinforce the credibility of the findings of this study. This can be done by performing a triangulation of the results such as interviewing experts and researchers competent on the matter or by leading an experimentation that illustrates the knowledge produced by this study. Moreover, the study opens the door to further research on

comparative methods and within-case methods of analysis for case studies in Humanities.

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