Université de Montréal

Video Game Design for Empathy: A Better Understanding of Game Mechanics and Player Interactions

Par
Edgar Eduardo Aguilar Pérez

École de Design

Mémoire présenté à la Faculté de l'aménagement
en vue de l'obtention du grade de M. Sc. A. (aménagement)
en Science de l'aménagement
option Design et Complexité

Août 2020

Université de Montréal
Faculté des études supérieures et postdoctorales

Ce mémoire intitulé :

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Presenté par :
Edgar Eduardo Aguilar Pérez

A été évalué par un jury composé des personnes suivantes :

Philippe Gauthier, président-rapporteur
Louis-Martin Guay, directeur de recherche
Normand Roy, membre du jury

Résumé

La recherche scientifique sur les jeux vidéo s'est longtemps concentrée sur l'impact de ceux-ci sur le niveau d'agressivité des joueurs, avec un accent mis sur le contenu des jeux. Initialement perçus comme ayant une influence négative par le public et même un certain nombre de chercheurs, des résultats plus récents montrent que les jeux vidéo provoquent une expérience cathartique plutôt que directement stimulante. La motivation principale derrière la recherche ici présente est la possibilité d'employer des jeux vidéo pour développer l'empathie et autres comportements pro-sociaux. En effet, des études récentes montrent que les mécanismes d'interactions entre les joueurs (plutôt que le contenu du jeu en question) ont un impact certain sur leur comportement futur. Or, ces mécanismes sont généralement un sous-produit du mode de jeu visé, ils sont régis par une interaction émergente. On propose que, en appliquant des principes de design qui sont déjà appliqués dans d'autres objets ludiques (i.e. les jeux de société thérapeutiques), à la conception de jeux vidéo, un effet positif et durable pourrait être obtenu au sujet des comportements pro-sociaux des joueurs. Ainsi, en joignant des éléments narratifs et visuels à un mode de jeu qui promeut l'empathie, on pourrait transformer l'expérience traditionnelle du jeu en un outil psycho-pédagogique important. Une analyse d'un jeu vidéo commercial à travers la lentille du cadre théorique développé ici donne un aperçu de ce qui se fait actuellement dans l'industrie et de ce qui peut être fait pour améliorer davantage la conception de jeux vidéo.

Mots-clés : design de jeux vidéo, design empathique, empathie, développement de l’enfant, mécaniques de jeu.

Abstract

Research regarding video games has long focused on the effects they have on the aggression levels of the players, with an emphasis on the content of games. These effects have generally been regarded as negative by early researchers and the general public, even though more recent findings have shown that they have a cathartic effect rather than pure arousal on the player's emotions. The main motivation behind this work is the potential positive effects video games may have on empathy and other prosocial behaviours. Recent studies on video games have shown that the interactions between players and other social components present while playing have a greater influence on the players future behaviour than the content of the game. These interactions are often a by-product of the intended play patterns such as cooperative gameplay and are very few times elicited intentionally by the designers. It is proposed that by applying design principles that are currently present in other ludic artefacts, such as therapeutic board games, to the design of video game mechanics, a positive and lasting effect on the players prosocial behaviours can be achieved. Game mechanics that compel players to interact in positive ways in coordination with narrative and visual components have the potential to transform the ludo-narrative experience of video games into powerful psycho-educational tools to improve the development of empathy and other prosocial behaviours in children. An analysis of a commercially available video game through the lens of the theoretical framework developed here provides insight into what is currently done in the industry and what can be done to improve video game design further.

keywords: videogame design, empathic design, empathy, child development, game mechanics.

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1.0 Introduction

In the year of 1982 the silver screens of the world witnessed the release of *Blade Runner*, a science fiction film directed by Ridley Scott based on the novel *Do Androids Dream of Electric Sheep* by the famed author Phillip K. Dick. The nearly two-hour film follows Rick Deckard, a bounty hunter employed by the Los Angeles police department, tasked with hunting down and retiring (i.e. killing) a renegade group of genetically engineered and enhanced humans known as Replicants. During the movie, Deckard must search and identify these faux humans by administering the Voigt-Kampff test: a series of questions designed to provoke an emotional response in the interviewee. By measuring their response time, he is able to determine their humanity or lack thereof and deal with them accordingly. This film is widely considered to be a masterpiece of cinema and the cornerstone of the cyberpunk aesthetic, praised by the questions it raises regarding humanity, morality, and the effects of technology in future human society. Nevertheless, the film merely scrapes the surface of one of the central themes that the novel explores: empathy.

In the novel, Dick describes the replicants as electronic beings of such high-level construction that they are practically indistinguishable from actual humans despite being completely synthetic. However, they can be identified by their complete lack of empathy, as they show no regard for other creatures nor for others of their own kind. This difference between the androids and humans shines as the central theme in the novel. In the dystopian future envisioned by the author, the world's animal population is almost completely gone and, as a result, electronic animals are produced and cared for by humans to demonstrate their empathy. Religions in this future have been replaced by Mercerism, a cult to Mercer, a sort of prophet living in an eternal pilgrimage that puts him in great physical and emotional pain. Participants in this cult would connect to empathy boxes that create an instantaneous connection with Mercer and all others connected, allowing them to vicariously live each

other's experiences. These empathic connections are shared by all humans in the book regardless of their social or physical conditions, even characters with severe cognitive damage caused by radiation and relegated to living as second-class citizens participate in these rituals. The contrast between the empathetic humans and the unfeeling androids is played throughout the book in various passages and conversations, several of them demonstrating Deckard's humanity. However, a popular discussion among fans of the book and movie is whether Deckard is an android himself. The movie is deliberately vague in this regard, but the book is quite clear, and as we have mentioned before, it goes to great lengths to show Deckard as a human through his display of empathy. The confusion among the public is nevertheless understandable once we consider the complexity of the story and the depth of the world it is set in. The amount of story details and lore surrounding the central theme of empathy as the defining trait of humans is rich enough to captivate the audience and obscure what would otherwise be a clear statement about the human condition.

A similar phenomenon occurs in today's video games. As they become more complex as a medium the amount of details surrounding the core ideas of the designers become increasingly distracting and the uninitiated are quick to miss the forest for the trees. It is not new to read headlines about how video games are rotting the children's minds by teaching them to commit violent crimes and drive recklessly after a parent watched their child play the latest first-person shooter for a few minutes, or entire news articles blaming video games for whatever latest tragic event. These kinds of opinions come from a fundamental misunderstanding of how both learning and video games work by reducing two very complex experiences to little more than behavioural imitation. Understanding what and how people can learn from video games would not only help the public opinion about the industry, but it would also help designers and educators to create better learning tools in the form of video games.

The work presented here is the result of a research process on the subject of video game design in an effort to better understand the role of game mechanics and player interactions in video games that could help to elicit empathy and other prosocial behaviours in their players, especially in children. This document begins with an exploration of human cognitive development from a psychological and constructivist perspective identifying the crucial stages where empathy starts to develop and those when external interventions would be the most beneficial. Then, a brief exposition of what empathy is and how it develops and works in typical individuals as well as an exposition of the detrimental effects a deficient development of empathy has on individuals at intrapersonal and interpersonal levels. Followed by a discussion of the role of playing and games in the cognitive development of children and their effects on prosocial behaviours such as empathy. Continuing with an analysis of the potential that video games present to be used as educational tools and how they aid in the teaching and correct development of empathy. Special attention is given to the role of gameplay mechanics and player interactions in the ludo-educational process taking prior research on the effects of video game playing on the human psyche and the development of experience-based learning games as a base for developing a series of design recommendations that can be utilized by future designers and researchers to develop better empathetic video games. Finally, an analysis of a commercially available video game is done in order to gain insight into what is currently being done in terms of video game design for empathy and how this could be improved in the future according to the theoretical exploration developed throughout this text

The hope of this project is that the conclusions reached will serve as the basis for future research on video game design, particularly how it can be used to elicit specific interactions between the players to create better video games that are not only fun but also helpful and healthy for the social and emotional development of their players.

2.0 Empathy

Empathy is commonly referred to as the ability to understand the feelings of those around us without necessarily having to experience the same events, the Merriam-Webster dictionary defines it as:

> The action of understanding, being aware of, being sensitive to, and vicariously experiencing the feelings, thoughts, and experience of another of either the past or present without having the feelings, thoughts, and experience fully communicated in an objectively explicit manner also **:** the capacity for this. (Merriam-Webster, n.d.)

In the simplest of ways, it is a process that allows an individual to understand the feelings of others, and in turn acts as a regulatory mechanism of their actions. As such, it is considered to be a prosocial behaviour, given that it facilitates positive social interactions within members of a group. In this way, we can then understand empathy as a social mechanism that regulates the actions of individuals towards members of their group through the understanding of their feelings.

It is important to recognize that empathic behaviour is not exclusive to humans, since empathy and other prosocial behaviours, like cooperation, have been observed in animals, especially in other mammals (Yamamoto & Takimoto, 2012). The first animal group where empathy-like behaviours were noticed was the primate family, the now classic experiments with chimpanzees carried out in the 1960's demonstrated with physical and observable evidence that primates are capable of empathy (Pierce, 2008). Later studies have continued to demonstrate this fact and expanded our understanding of the animal capacity for empathy. For instance, chimpanzees have shown to not only be able to experience empathy as a mental state but to actually act in response to it. Chimpanzees will consistently comfort distressed

individuals, help those in dangerous situations (even if this endangers their own wellbeing), ask for help when another chimpanzee is hurt or is in a dangerous situation, among many other behaviours (O'Connell, 1995).

As many of the mammalian species on the planet live in groups, the need for these types of social behaviours is evident since they significantly increase their chances of survival. More often than not, the strength of such groups resides in the ability of their members to care for each other and work together for the benefit of the group. Langford and his team (2006) have demonstrated this in a series of experiments involving small non-primate mammals, namely mice. The experiment consisted of injecting a mouse with an acetic acid solution, which caused him pain, in the presence of other mice. The expectating mice showed signs of distress when witnessing the pain of the injected mice without having gone through a similar experience themselves and reacted pre-emptively with fear and caution when approached by the researchers after witnessing the injection. The mice responses clearly imply that they are capable of empathy and that it generates persistent knowledge which dictates future behaviour. It is not farfetched then to imagine this process occurring in nature and the benefits it represents for the survival of the group. The results of this research represent a breakthrough in our understanding of animal behaviour and of empathy as a whole: not only it demonstrates that non-primates are capable of empathy but it further cements the importance of empathy as a prosocial behaviour that benefits the individual through its relationship with the group. Considering this, it is safe to say that empathy is a very important ability for social creatures including humans, who depend in many ways on other members of their group and live in complex societies that require a high degree of interaction.

In humans, the development of empathy starts from infancy and reaches the final stages at the beginning of adolescence (Piaget, 1948; Schaffer 1996), but before we can talk

about how empathy develops we need to talk about human cognitive development, as to have a general understanding of it and how it is related to the development of empathy.

2.1 Cognitive Development

The fields of neuroscience and psychology are the two major lines of research that tackle the endeavour of studying cognitive development in humans, albeit with very different approaches. While neuroscience focuses on the biological workings of the mind and seeks to explain how the brain functions and the different physiological processes behind it, psychology looks at the individual and how they interact with others, their environment and the psycho-social relationships that shape them into who they are. In this sense, the psychological approach offers us a better point of view to elucidate the potential of video games to be used as an empathy teaching tool for children.

The psychological study of children can be divided into two major branches. The first one is child therapeutic psychoanalysis as developed by Anna Freud and Melanie Klein. Their theories are based on the works of Anna's father Sigmund Freud, who is widely regarded as the father of psychoanalysis (Donaldson, 1996). Sigmund's work and research were cantered on the psychological treatment of adults, focusing on themes such as repression, the unconscious and sexuality, mostly through free association of speech (Mitchell & Black, 1995). This technique allows the patient to freely explore their mind with the purpose of uncovering the underlying causes of psychological ailments. These causes are commonly buried in what Sigmund Freud has described as the unconscious, and it is through speech that the patient slowly brings them up to the conscious level of the mind where they can now recognize them (Kris, 1992). Anna Freud and Melanie Klein took the core ideas of Sigmund's work and adapted them for their work with children. Although Freud and Klein developed their own particular branches of child psychotherapy, they both coincide in the use

of play as the main means of communication between the therapist and the children (Donaldson, 1996). It is important to note that this line of research is focused on the clinical application of child psychology following the paths laid by Sigmund Freud in his psychotherapy for adults, and as such its goal is to apply this knowledge for therapeutic purposes.

The role of play was further studied by Donald Winnicott, who positioned himself in a conciliatory midpoint between the views of Freud and Klein on child psychoanalysis. Winnicott described play as a viable substitute for speech in children and as such he finds it to be the focus during the therapeutic process (Grolnick, 1990), but he also saw the value of play in the study of child development. Through a series of experiments, he developed what he called “objective observation” as a tool for assessing child development with an emphasis on play (Winnicott et al., 2011). For Winnicott, the way children play is a reflection of their relationship with reality at both conceptual and practical levels, especially how they interact with their mother figure during play (Winnicott et al., 2011).

The second line of research is closely related to Winnicott’s observations as it focuses completely on the study of child psychology from a developmental approach, in an effort to understand how the mind is developed during the initial years of life. One of the most important researchers in this area was the swiss psychologist Jean Piaget, who worked primarily on the cognitive development of children. The work of Piaget is used to this day in the formation of educators and psychologists as it provides an important insight into the inner workings of the child's mind. Through his work, Piaget described the cognitive development of children in four stages from birth to adolescence or around 12 years old (Piaget, 1936).

Beginning with the sensorimotor stage, from 0 to 2 years old, children start to recognize their own bodies, making links between their physical self, their actions, and how they are related. Later, towards the end of the stage, they start to explore their surroundings,

driven by curiosity (Piaget, 1936). The second step is the preoperational stage from ages 2 through 6, where representation and interiorization begin to appear. During this stage, the symbolic functions start developing through physical and verbal imitation of the adult behaviour, mainly their parents, but also through play; in contrast, intuitive thought is not yet fully developed. By this point, children are not capable of understanding abstract concepts such as volume conservation (Piaget, 1936), and they are also incapable of comprehending that other people have a different perception of the world to theirs. For the children in this stage the world exists by and through them, all that surrounds them is an extension of themselves; this is what Piaget calls egocentrism (1951). The third stage is the concrete operational stage which occurs between 6 and 12 years old. During this stage, the children develop most of the more complex cognitive abilities such as reversible logic operations, the principle of conservation, seriation, classification, inclusion, and others, even when the objects or people involved are not physically present. They are now also capable of understanding the separation between themselves, their environment, and others (Piaget, 1936). The fourth and final stage is the formal operational stage that starts at age 12. From this point on the children are now capable of utilizing abstract thought, formulate hypothesis, planning, and deduction. This is considered to be the end of cognitive development and where all people stay for the rest of their life (Piaget, 1936).

2.2 The Development of Empathy

As we have previously established, empathy is one of the most important prosocial behaviours and it has a considerable impact on the development of children (Eisenberg & Miller, 1987). Because of this, empathy has been the focus of many studies through the years. There are two main optics from which empathy has been studied. The first one is known as "cognitive empathy" and it centres around the reasoning processes behind empathic

behaviours. Cognitive empathy is considered as the ability of an individual to identify and recognize the condition of others (Piaget, 1948). The second optic of research is “affective empathy”, this type of empathy concerns the ability of an individual to have an emotional response to the feelings of others (Hoffman, 1985); in other words, this refers to the ability of an individual to have an emotional response when exposed to the feelings of others.

2.2.1 Cognitive Empathy

According to Piaget (1948), cognitive empathy begins during the transition between the preoperational and the concrete operational stage or around 6 to 7 years of age, when the children leave their egocentrism and begin to fully understand the difference between their experience and that of others. Before this moment, the relationship the child has with others is determined in part by their age, Piaget (1948) notes that children at this stage have little interest in other children of around their own age and are much more interested in older individuals be them adults or older children. These older people have a structuring relationship with the child, by providing them with rules and rituals that shape the universe of the child who, during this time, is incapable of distinguishing them from their own rules and rituals. Even when they come from an external source they are internalized by the child as if they were of their own design and treated with the same regard; in other words, there exists no conceptual distinction between the self and the other. Piaget (1948) also mentions this can be observed particularly during play, when younger children will most of the time adapt their play to that of older children by following their rules, restrictions and patterns. What is interesting about this is that it does not seem to come from a desire to emulate or mirror the actions of others in an attempt to belong or insert themselves into the group, but from the constant assimilation of external rules. The child in fact will continue to play more for and by himself rather than with others. This kind of behaviour is why the egocentric phase of the

child is considered as presocial; this is to say, it appears before the child is fully capable of understanding the difference between themselves and society (Piaget, 1948).

In this sense, cognitive empathy is also closely related to the concept of "theory of mind", where an individual is capable of distinguishing the separation between their own consciousness and that of others (McDonald & Messinger, 2011). Experimental observations (Wellman et al., 2001) have demonstrated that this ability is absent in younger children, it is only after reaching around 5 years of age that they will show this capacity. The prime example of this is the "false belief" experiments, where children are shown how a person places an object in a cabinet or drawer and exits the room, then a second person comes into the room and moves the object to a different location. The children are then asked where they think the first person will look for the object when they come back. Young children will consistently fail the test by suggesting they will look into the second location, since for them there is no difference between what they know and what others know; perceptions, knowledge, and consciousness are perceived as universal and they are therefore unable to comprehend others as external to themselves. On the other hand, older children will correctly assume the first person will look for the object in the original location since that is where they last saw it (Wellman et al., 2001). Cognitive empathy is therefore not limited to the realm of emotions but it entails the entirety of individual experience, from knowledge to sensations, and feelings; the capacity of understanding the uniqueness of them is what ultimately allows children to move from an egocentric conception of reality to a sociocentric one (Piaget, 1951).

2.2.2 Affective Empathy

In contrast to cognitive empathy, affective empathy revolves around the emotional reaction an individual has to an external stimulus, and more specifically towards the emotions experienced by others (Hoffman, 2000). According to Hoffman, as described by Schaffer (1996), affective empathy manifests itself from the start of life and does not require a specific set of cognitive abilities to function. What the child does or not with the ability is, on the other hand, dependent on their cognitive development. The first step is called “global empathy” and it develops during the first year of the children's lives. During this first step the children will imitate the emotions they witness; this is reflexive and involuntary.

The second step is the “egocentric empathy”, it is produced during the children’s second year of life. Now, the children are able to identify the emotional distress of others, and they will most of the time have both affective and operational reactions. Children that exhibit egocentric empathy will try to comfort others that they identify as distressed. However, the actions they will take to this end will oftentimes be what they themselves find comforting. The empathy exhibited during this step is considered as egocentric because the children cannot comprehend that the experiences of others are different from their own.

Next is the “empathy for the feelings of others" which happens at the age of 3. The empathic behaviour shown during this time is very similar to that of the previous step, but due to the apparition of imitation and “role playing” the children are now able to differentiate their feelings from those of others and, by consequence, their reactions are mostly more appropriate towards their feelings.

The fourth and last step of affective empathy development is the “empathy towards the lives of others”. This step occurs towards the end of childhood and the beginning of adolescence, from this point forward the individual is now capable of understanding that the feelings of others are not always related to their immediate experiences, and that they can be

a result of their life situation. They are also capable of showing empathy towards whole groups of people, such as, the inhabitants of another country or the victims of a natural disaster.

2.3 The Two Empathies

More recent research suggests that these different empathies are two facets of the same concept (Hoffman, 2001). This conceptual understanding of empathy implies that it works in distinct levels simultaneously. On one hand, we have the cognitive side which bears the task of recognition and understanding of feelings and emotions, it also plays a role in abilities like perspective-taking and facial gesture interpretation (Reid et al., 2012). On the other hand, we find the affective empathy, tasked with everything related to the emotional response to emotions and feelings, it regulates the visceral reaction and provides the affective framework of an individual which in turn dictates the emotional reaction towards life experiences (Reid et al., 2012). This multidimensional approach suggests that empathy is both cognitive and affective at the same time; while each facet operates individually, they work in concert to produce what we recognize as empathy and empathic behaviour. This requires for both empathies to be well developed and robust enough to perform their tasks effectively for the whole process to operate with the expected performance.

Nevertheless, it is possible for an individual to have different levels of each one depending on their cognitive condition (Zoll & Enz, 2010). For example, people that present Asperger syndrome show diminished levels of cognitive empathy when compared to people with typical development; on the contrary, they show levels of affective empathy well within the norm (Rogers et al., 2006). New scales have been created that measure the multidimensionality of empathy, and some of them add a third dimension, like is the case of

the K.E.D.S. scale, developed in Australia. This scale adds the operatory dimension which measures the complexity of the empathic response of children (Reid et al., 2012).

2.4 Consequences of Weak Empathy Development

Even though the empathetic behaviours begin manifesting during the transition between the pre-operational stage and the concrete operational stage, preceded by reactions guided through affective empathy, it is important to keep in mind that empathy does not appear suddenly. Rather, empathy is a cumulative construct built up from a series of factors and experiences during the first years of life and enriched by ludic learning activities like it has been explained before. Unfortunately, due to this variable character, not everyone is able to adequately develop empathy during their life. (S.P. & Gonzalez, 2013). Another interesting thing to note about empathy is that it is not of boolean nature; in other words, empathy is always present, even when some individuals seems to show a complete lack of empathy this is extremely rarely the case. A study (Ritter et al., 2010) conducted on individuals diagnosed with Narcissistic Personality Disorder (NPD) assessed the criteria of "lack of empathy" as described in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) as a defining factor of the disorder. The participants were evaluated utilizing both traditional and more recently developed empathy tests and the results were compared against those of a control group which included healthy individuals and individuals diagnosed with Borderline Personality Disorder (BPD). The results of the study showed that even though at face value those diagnosed with NPD would appear to have no empathy at all, they would in fact show typical levels of cognitive empathy and a noticeable deficit of affective empathy when compared to the control group. In other words, the individuals diagnosed with NPD are in fact capable of understanding and identifying the emotions of others just as well as the

control group, but they show almost no emotional response to them. This shows that even on individuals with clinically diagnosed conditions empathy remains always present.

Elevated levels of empathy allow the individual to have profound affective responses, which in turn allows them to control their aggressive impulses. This restraint is motivated by an understanding of the negative effects that said aggression would have in case of being enacted (Hoffman, 2000). A study conducted by Gini and co-researchers (2007) measured the empathy levels of two groups of students in Italy. The first group were students that routinely showed aggressive behaviour towards their peers, categorized as “bullies”, they showed weak empathy levels and high aggression levels. The second group were students that showed protective behaviours towards their peers, categorized as “defenders”, and having higher empathy levels. Similarly to the subjects with NPD, the students categorized as “bullies” had typical cognitive empathy levels but lower affective empathy levels, meaning that while they understood the consequences of their actions they were not affectively involved in the process.

Understanding empathy as a complex multifaceted process allows us to think about possible ways to address the issue of inadequate empathy development. According to what has been explored so far, such an endeavour should start from an early age to have the greatest impact in individual development. It is then proposed that playing and more specifically games are a viable vehicle for such an intervention due to the critical role they have in human development (Gray, 2011; Piaget, 1982).

3.0 Playing and Games

Play appears in many shapes and forms and it is present throughout the extent of our lives in higher or lower degrees. It would be safe to say that most people, myself included, have at least one memory of running around as children having the time of their lives. Maybe they were alone, maybe they had some playmates, maybe they were even pretending to be adventurers but, they were all engaged in a state of mind that allowed them to almost escape into a different world. This is what playing does for humans, it allows the mind to wander and stretch, to imagine we are something else; that we are somewhere else if only for a brief moment (Brown, 2008).

The play experience only enhances when we play in groups, what Brown & Eberle (2017) define as social play, it allows individuals to very quickly and easily connect with the other players. For instance, children in a playground or even adult sports fans, who are mostly strangers, are able to connect through the game space. This allows them to interact with each other in different terms, under the framework of play. Playing provides a social space, separate from the regular environment, be it a park, school yard, house or any other place, that offers the possibility of a connection that would otherwise be much more difficult for a variety of reasons. It allows players to bypass many of the barriers that would be obstacles in other circumstances by providing them with the common ground necessary to engage with each other, the ability of play to create this connection goes even farther than across ages or cultures, it even allows cross species relationships to develop. A family playing with their dog and a biology researcher teaching chimpanzees to arrange objects are both forming interspecies bonds through play, it is no coincidence that most experimental research that involves animal behaviour has some kind of game involved, it's the cornerstone common ground we have with other species; a space we share where we can connect in a level that would be impossible otherwise. Peter Gray (2011) has noted the importance of play in the

early stages of child development through a series of social researches. He concluded that the decline of free-play, this means ludic activities with no specific intent or purpose in contrast to organized sports, has a direct correlation to the increment of negative social behaviours and psychological distress like anxiety and depression in adolescents and younger adults which have become prevalent in recent decades.

3.1 Cognitive Development and Play

Cognitive development can be considered as a learning process: the brain develops naturally but only to the extent of external stimuli; this is to mean that the environment in which children grow will have an important effect on their cognitive development, and as such, it is necessary to talk about the mechanisms by which children learn (Galet, 2014). According to Piaget (1982), the main means by which children learn, up until around 12 years, old is play, and it has different functions according to each of the stages of cognitive development.

Exploratory play is what occurs during the sensory-motor stage, it is characterized by exploration of the children's bodies and their surroundings. For example, the children will play by touching their feet and face, or by manipulating their environment (Piaget, 1982). They primarily play with objects they can hold and experience at a sensory level; this includes things like trying to smell and taste them. This object-play has been noted to have important implications in later stages of life. Brown (2008) mentions that people who did not engage in this kind of play have reduced problem solving abilities compared to those who did. Next, we find the preoperational stage, during which children start to use symbolic play. This type of play consists mainly of imitation and "make believe": the children understand that objects have a specific function, but they are now capable of replacing that function at a symbolic level during play sessions (Piaget, 1982). The next stage is the concrete operational,

where the game with rules starts to appear. During this stage, children start to engage in more complex games that regularly include clear and well-established rules. These games can be anything like board games to organized sports (Piaget, 1982). This type of games demands a higher level of interaction between children as opposed to the ones during the preoperational stage which tend to be more individualistic. The preoperatory children may be together with other children while playing, but they all play independently from each other, almost completely isolated. Nevertheless, as they approach the end of the preoperational stage and start to go deeper into the concrete stage, they become more social and start to include others in their games (Piaget, 1982). As such, we can consider that the transition from an egocentric being to a social being is linked to the rise of pro-social behaviours that allow the children to interact with others beyond the most basic interactions. Starting in the preoperational stage, the interaction between children becomes more complex, and they begin to show prosocial behaviours such as cooperation and empathy (Piaget, 1951). Getting involved in this social-play (Brown & Eberle, 2017) not only allows the brain to develop properly but it also provides the children with an opportunity to exercise social skills and emotional regulations which have an important role in mental health throughout their lives (Gray, 2011).

3.2 Cooperative Play and Empathy

The developmental implications of play are however not limited to the cognitive abilities of children; parallel to it, social emotional development is also affected by play. Especially relevant to this research is the effect that cooperative play has in the development of prosocial behaviours such as empathy. According to research conducted by Brownell and her team (2002), playing with similarly aged children promotes a strong development of a vast array of empathic abilities as these are required in order to participate in the play. This

phenomenon is only fuelled by cooperative play patterns which require the children to interact positively with one another:

> Furthermore, peer play forces children to behave altruistically and to take account of one another's feelings, whether real or imagined. Peers share play materials based on inferred emotions in others and they collaborate in thematic play based on inferred desires and intentions of others. They also participate in the altered realities of joint pretend play, which includes sharing altered emotional realities such as pretending to be afraid of the jointly imagined tiger, to be distressed by the jointly imagined pain of its teeth, and to be overjoyed by the jointly imagined superhero's rescue. (Brownell et al., 2002; p. 3)

In this way, we can understand that empathy comes as a direct consequence of cooperative play between children. Playing together, as Brownell mentions, means participating in a shared conceptual space which requires each individual child to be capable of tapping into each other's' emotional states and reacting to them accordingly in order to play in coordination with the group. The cooperative aspect of this kind of play carries a lot of the responsibility, since sharing common intentions and goals augments the need for empathic abilities. This awareness of the other and their emotions along with its use as the root for behaviour is what Hoffman (2001) recognizes as the whole of the empathic process.

4.0 Video Games

After the adoption of smartphones as the new standard for on-the-go communication, a whole new market opened. Video games were no longer for children only, confined to consoles or portable devices like the Nintendo Game Boy series or the Sony PlayStation Portable (PSP). Now everyone that had a smartphone was able to play at any time. This change in technological status helped solidify the presence of video games as a common occurrence. In contrast to the video game revival of the 80's, the average age of gamers has increased significantly. According to the Entertainment Software Association of Canada (ESAC) (2018), the average age of gamers is 39 years old in Canada going all the way up to 64 and as low as 6 years old as the recognized entry age. More people than ever play video games in some form, from children all the way to older adults who enjoy casual games like Candy Crush Saga (King Digital Entertainment) mostly in their mobile phones (ESAC, 2018). Recently, we have seen the rise of the professional gaming scene to international status pulling millions of viewers every year, thousands of competitors and with millions of dollars in prize money. For example, the 2018 League of Legends: World Championship had an expected prize pool of over 6 million US dollars, as reported by the Entertainment and Sports Programming Network (ESPN) (2019). So, it would be fair to say that video games are now part of everyday life for a large amount of people in one way or another.

4.1 What Do We Learn from Video Games?

Research on video games has seen a lot of interest from several fields. Not long after their widespread adoption by the public, they began to be studied by psychologists concerned about their effects on the human mind. Being targeted mainly towards children, there was a generalized concern about them being potentially harmful or detrimental to their growth. Nevertheless, studies in neuroscience showed that video games improve cognitive abilities in

the participants as well as other skills like memory, reaction time, information processing and more (Palaus et al., 2017). With these findings, the worry of video games harming the brains of children were somewhat set aside and allowed them to be viewed from other angles. Now they were no longer something to be feared and from which children had to be protected, as long as they were consumed with moderation as any other entertainment, but rather a medium that offered new possibilities to be explored and researched.

In the field of education, some of the most important contributions were made by James Paul Gee. His research has focused over the years on several subjects surrounding education, namely sociolinguistics and literacy, his main interest being on how we learn, and the mechanisms involved in the learning process and how they can be improved upon. Gee's work on video games has centred around their potential as educational tools, especially on explaining how they teach their players (Gee, 2008). Based on a surface-level observation, it is easy to assume that video games teach their content; this is to say, that a game set in a medieval fantasy setting would teach their players about knights, fairies, castles and so on. This assumption has been used as an argument by politicians and conservative groups around the world against video games in the past (Draper, 2019; Gerstenzang, 1995; Graham, 2020), particularly towards those depicting violent or dangerous situations, for example Call of Duty: Finest Hour (Spark Unlimited, 2004), a first-person shooter game where the player controls a character armed with an assortment of firearms and must fight against similarly armed human or AI-controlled opponents in different scenarios and objectives, or Burnout Revenge (Criterion Games, 2005), a racing game where the player competes on street races while driving as recklessly as possible, gaining points for going the wrong way, close calls and photo-worthy collisions. Games like these ones have on many occasions been the subject of criticism and blame, particularly from politicians and mass media outlets, for spreading violent and reckless behaviour through their content. Politicians like Donald Trump blamed

video games during the summer of 2019 after several mass shootings occurred in the United States of America:

> "We must stop the glorification of violence in our society," President Trump said on Monday in a White House address on the shootings. "This includes the gruesome and grisly video games that are now commonplace." (Draper, 2019).

Statements like this echo voices of the past, in the decade of 1990 Bill Clinton blamed titles like Doom (id Software, 1993) and Mortal Kombat (Midway, 1992) in a similar fashion after the Columbine massacre (Gerstenzang, 1995). The usual argument is that video games somehow insert the violence into the mind of the players, who then go and replicate the actions seen on screen in the real world. However, this comes from a rather simplistic, and often entirely wrong, understanding of how video games and the human mind work, oftentimes made by unprepared individuals desperately looking for an explanation to seemingly incomprehensible acts. Such is the case of Mexican officials after one of the very few school shootings in Mexican history. They quickly blamed video games as the root of the problem instead of looking further into the underlying psychological issues that are often the actual catalysers of violence:

> Miguel Riquelme, governor of the state of Coahuila, where Torreon is located, told a news conference that the boy, whose mother had died some years ago, had not had problems at the school. "He was well behaved, but he told some of his classmates that 'Today was the day,'" he said. "And what we can observe is that the boy was influenced by a video game." (Graham, 2020).

For Gee (2008), there is no such thing as this supposed monkey see, monkey do situation, video game players learn more about the actions they perform in the game and not so much about the content they consume while playing. The difference between these two concepts, content and action, is at the same time fairly obvious and somewhat unclear, as it is hard to distinguish between the two without some degree of overlapping. For instance, what we consider as the content would be all the non-interactive elements of a game (theme, character models, sound, narrative, lore, etc.). On the other hand, the interactive elements represent the actions the player performs better known as gameplay, it is here that the distinction becomes nebulous since a good amount of the actions a player performs are still part of the content. Going back to the aforementioned game Call of Duty: Finest Hour (Spark Unlimited, 2004) we can find some clarification. The setting for this title is the Second World War where the player takes the role of various Allied soldiers fighting against the Axis soldiers in a variety of scenarios presented as retellings of war stories. The player is required to shoot, throw grenades, plant explosives, drive tanks and other combat-related actions throughout the game to defeat the opponents and win. The historical backdrop, narrative, visual elements, sounds, music, character models and environments are the most evident elements of the game's content; however, other things such as shooting the enemy soldiers, which could be understood as the actions, are also part of the content as it is essentially informed by the rest of the thematic content.

Fig 1. A depiction of the siege of Stalingrad in Call of Duty: Finest Hour

The true action of the gameplay is the simplest expression of the act, in this particular case, pointing and pulsing a signal with the required precision to mark a target object in the game space. In the case of dodging for cover when being shot at or trying to flank an enemy for a more advantageous position, it would be the mental mapping and navigation of the game space when trying to reach a chosen position safely.

This distinction between content and gameplay has been widely explored by Gee (2008), as he argues that we must understand gameplay as the defining factor of video games as opposed to other mediums like films or books where the content constitutes the core of the work. In the case of video games, and arguably of all games, the content is almost an accessory to the gameplay. It brings depth and codifies the gameplay in the form of storytelling, visuals and theme in order to make it more attractive and engaging to the potential players. It also provides a context for all the actions the player will perform when inside the game but in no way defines these actions nor the game in general (Gee, 2008). For

an example of this, we can take almost any real-time strategy game (RTS); these types of games regularly involve the players in resource gathering, city building and strategic combat with the goal of winning either by military conquest or by other more diplomatic means such as achieving the highest economic rating, they can be played against computer-controlled opponents or against other human players. The thematic backdrop for these games is quite varied, going from different historical settings, Age of Empires (Ensemble Studios, 1997), to fantasy and science fiction, StarCraft II wings of liberty (Blizzard Entertainment, 2010), and even though their content is so varied, all these games share almost the same gameplay. All of them have their players perform the same basic actions, namely resource management, planning, and decision making, while engaging with widely distinct content. In this way, we can see that the actions required to win the game (gameplay), and not the theme of the game (content), is what defines them as an RTS game, and is therefore their most important feature. These games could very well be devoid of any thematic backdrop and they would still be identifiable and playable as RTS games. These games are constantly testing the knowledge and skills required to win, the same knowledge and skills they provide throughout the gameplay. If we were to replace the thematic content of one such game with something entirely different but retain the gameplay completely untouched, a player would be able to perform equally well and would in fact learn the same skills as with the original game (Gee, 2008).

The reason why this distinction is so relevant, not only to this research but to the field of video game research at large, is that games and more specifically gameplay, are excellent teaching tools. For example, David Schwarz and his team (2014) have successfully developed a series of electroencephalogram-controlled video games to teach basic neuroscience principles to high school level students. The students showed a very positive reaction to the activities and were more involved with the subject compared to traditional teaching methods

and expressed interests in continuing to learn about neuroscience in the future. Additionally, researcher and game designer Katie Salen (Salen Tekinbas et al., 2010) has co-founded the Quest to Learn public school in New York where she has developed a whole school curriculum integrating video games in every facet. Their students not only play games, they also make games, which according to Salen has had dramatic effects in improving the student's school performance. Applications like this one go beyond teaching something through playing and start teaching students to learn and how to think for the 21st century. As Gee (2008) mentions, good video games are inherently good at teaching, since they must be able to educate the player in the intended way of playing the game for them to be understandable and enjoyable.

The medium of video games has developed several teaching methods over the years, with some of the most evident examples being the tutorial levels, or training modes, available in the majority of games. These are essentially stripped-down versions of the game levels that provide the player with a safe space where they can freely explore the game and familiarize themselves with it without any pressure to perform. Nevertheless, Gee (2008) argues that video games in their entirety are teaching tools. The manner in which a video game presents information and then tests the player on this information is how humans learn more efficiently, not through a continuous stream of content, like listening to a lecture or reading a textbook, but through experience and the application of the newly acquired knowledge in incrementally complex tasks that will gradually require higher levels of expertise, and video games accomplish this by their very nature. They first present the players with the basic knowledge and skills required to play the game, oftentimes in a sandbox space. The first levels of the game will test this knowledge until the player has the expertise required to progress. Later levels with introduce new skills and more complex tasks that will in turn increase the required expertise from the player, this pattern will continue until the end of the

game and it is what Gee describes as “cyclical expertise” (2008). The scaffolding of skill and knowledge that video games employ is similar to the way learning is traditionally understood by Bloom’s taxonomy (Fig 2, Krathwohl, 2002). Here, the learner advances through a series of stages that go from simply remembering information all the way to creating it.

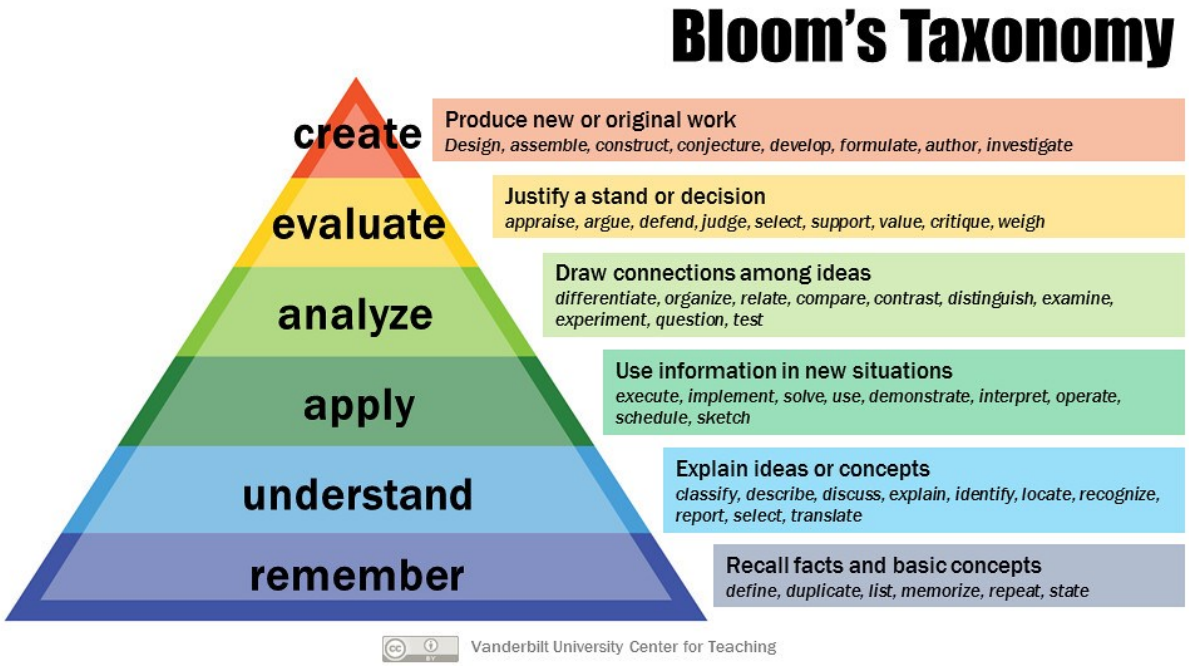

Fig 2. Bloom’s taxonomy depicted as a pyramid (Krathwohl, 2002)

Moving from one stage to the next one requires cumulative expertise, meaning that further stages build on top of the previous ones and thus require the learner to fully master them before progressing any further (Krathwohl, 2002). Expertise in video games, like in other subjects, does not stop at a mechanical skill application level and very often goes all the way to the top of the taxonomy with the most proficient players expanding the game with their own creations. Sport games like FIFA 2020 (Electronic Arts, 2019) and real-time strategy games like StarCraft II wings of liberty (Blizzard Entertainment, 2010) allow the player to approach them from an almost completely free vantage point, which allows for novel strategies and play patterns that constitute creative expressions from the part of the

players that after a while become part of the greater mechanical vocabulary of the game. Other players may engage in thriving modding communities like that of The Elder Scrolls V: Skyrim (Bethesda Game Studios, 2011), who have produced thousands of new creations to expand the original game.

The cyclical nature of video games has been further studied by Perron and Arsenault, with the former proposing a model he calls the “heuristic cycle of gameplay” (Fig 3, Perron, 2006) to explain the relationship between the game and the player. In this cycle the game initially generates an output of information based on its programming, which is then received by the player who processes it by utilizing their senses and cognition. The result of this process triggers an action regulated by the player’s skill, which becomes an input for the game, then, this input modifies the state of the game which in turn generates a new output starting the cycle again. This model illustrates the mechanisms by which playing a video game is, at its core, a learning experience: the player is essentially presented with information which has to be absorbed and understood, then the player applies this information through their actions and the game provides instantaneous feedback. This feedback is basically an evaluation of the player’s performance and is directly related to how well the information presented by the game has been understood by the player. If the game is doing its job correctly, the player will have no problem learning everything needed to succeed (Gee, 2008).

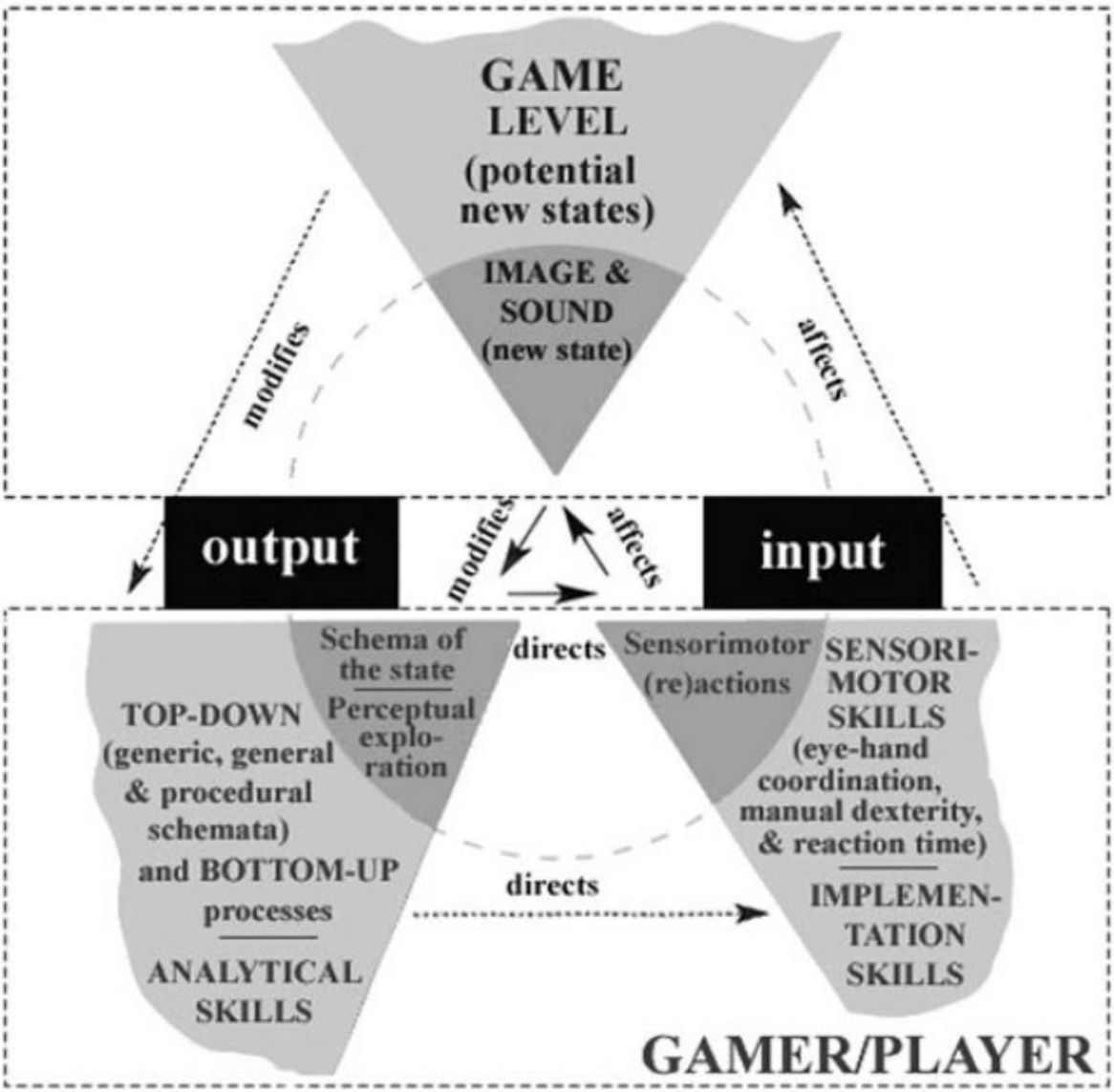

Fig 3. The Heuristic Circle of Gameplay (Perron, 2006, p. 66)

While Perron's model illustrates this principle, it considers the heuristic cycle of gameplay as a static process. Arsenault has proposed an evolution of this model to show how this relationship evolves over time (Fig 4, Arsenault & Perron, 2009). He explains that when taking time into consideration, the proposed model would exist in a three-dimensional space and, as result of this, it would be better represented as an ascending spiral instead of a flat circle. Said spiral ascends as time goes on and widens in diameter to represent the growth of gameplay and the progression of skill and knowledge in the player; in other words, the more

the player progresses through the game, the wider each cycle will become and the higher they will reach. Arsenault also includes two additional spirals to his model, one representing the narrative dimension of the game and the other the hermeneutic dimension. These additional spirals operate in the same manner as the gameplay spiral although they all grow independent to one another, this depends on both the type of game and how the game is approached by the player. Video games, depending on the genre, will naturally tend to lean heavier towards one of these dimensions; for example, fast paced action games are commonly more focused on gameplay while more story-driven games will centre around the narrative. Moreover, how the player chooses to play the game also affects the growth of the spirals. If, for example, the player plays to uncover the story without mastering the skills required, the narrative spiral will be wider than the gameplay spiral (Arsenault & Perron, 2009).

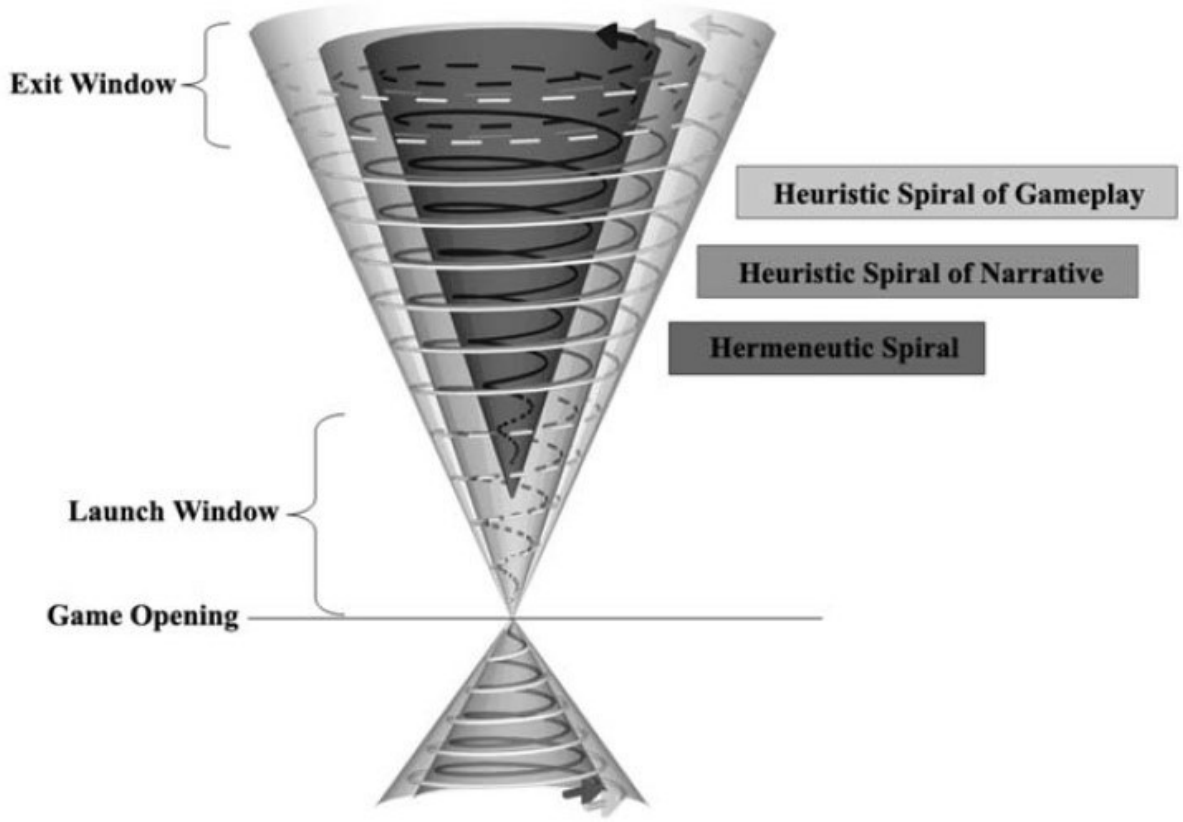

Fig 4. Arsenault's heuristic spirals (Arsenault & Perron, 2009, p. 116)

Video games are, in a sense, a complete teaching system by nature, as they deliver the knowledge and enable the player to put it into practice within the same space, allowing them to hone any skills they acquire and achieve deeper levels of understanding on the subject matter. They also evaluate the player's proficiency and deliver instantaneous feedback which empowers the player to take control over their learning. These characteristics are shared by the educational model known as experience-based learning (EBL). In EBL, pupils are expected to learn through a variety of activities based on action and first-hand experience which will help them to construct their own knowledge, not only teaching them about a specific subject but rather teaching them how to learn (Andresen et al., 2000). Practice and direct contact with the subject matter are at the heart of EBL and as such the activities that will utilize it effectively must consider the following points according to Andresen et al. (2000):

> iv. Intentionality of design. Deliberately designed learning events are often referred to as 'structured' activities and include simulations, games, role play, visualisations, focus group discussions, sociodrama and hypotheticals.
>
> v. Facilitation. This is the involvement of some other person(s) (teachers, leaders, coaches, therapists). When such persons are involved, the outcomes may be influenced by the degree of skill with which they operate(...).
>
> vi. Assessment of learning outcomes; and in the event that assessment takes place, much depends upon by what means, by whom, and for what purpose it is carried out. EBL is often as much concerned with the process as the outcomes of learning, and assessment procedures should accord with this(...). (p. 226)

Both intentionality of design and assessment of learning outcomes are shared characteristics between EBL and video games. In the case of the latter, they are integrated into the heuristic spiral of gameplay, which allows them to teach their players efficiently. It is important to remember that players are learning what they are doing to play the game; this is to say, they are learning their experience with the game. It then follows that video games whose design is centred around the gameplay mechanics are posed to be very effective teaching tools through models like EBL.

4.2 Content and Interactions

Even as we have already established that video games do not teach the player to enact their digital feats on the real world, a point could be made regarding virtual simulators and serious games, both being video-ludic experiences whose purpose is for the player to apply the same abilities and actions they perform while playing them in the real world. However, the reason we are referring to them as video-ludic experiences and not video games, is that their main purpose is not to provide entertainment but to educate the player in a specific subject. This purpose is clearly stated and constitutes an important part of the identity of these experiences. When a player approaches and interacts with them, they are conscious of the instructional intentions of these virtual experiences and are thus contained in a different cognitive category to video games. The debate about the effect that video games may have on people, especially the notion that video games depicting violent or aggressive situations would cause these to arise on the players, has been a long one; so long, in fact, that it seems to never stop and takes on new life whenever a tragedy strikes and an explanation is desperately needed (Draper, 2019). Such a discussion has, nevertheless, been put to rest in academia. The assumption that constant exposure to violent content such as movies, graphic novels, television shows, but specifically violent video games, had long term effects on the

players up to the point of increasing their aggression levels enough to modify their behaviour (Anderson & Dill, 2000) was initially regarded as truth and supported by some studies.

For instance, a recent study conducted by Greitmeyer (2018) attempted to measure the spread of aggression and violent behaviour in the social network of adult players of violent video games. The experiment consisted of a self-reported questionnaire about the amount of time friends of the participants spent playing violent video games and the amount of aggressive behaviour displayed by the participants. The results of the experiment showed a positive correlation between the two measured variables, leading the researcher to conclude that aggressive behaviour spreads through unexplained mechanisms. However, claims like this one have long been disproven, and in fact no solid evidence of such claims are to be found in adequately rigorous, peer-reviewed research (Unsworth et al, 2007).

Moreover, later studies have found that video games, and even violent ones, have little to no effect on the aggression levels in individuals and, in some cases, they would even reduce said levels. This was reported by Unsworth (2007) in a study where the aggression levels of the participants were measured before, during, and after playing Quake 2 (id Software). Quake 2 is a first-person shooter game where the player must fight against alien adversaries in an effort to stop an alien invasion to Earth utilizing an arsenal of powerful firearms. The participants played the game for 15 minutes during which they were asked to speak their thoughts out loud; these were recorded and used to measure their aggression levels. Additional State-Trait Anger Expression Inventory (STAXI) tests, a self-reported questionnaire that measures the presence, intensity and frequency of anger, were also applied before and after the gaming sessions with the same purpose. The findings of the study showed that violent video games did not increase the aggression levels of the players. However, some very interesting effects were observed. The participants that scored higher on the aggression scales prior to playing showed a decrease in aggression after the gaming

session, while others that scored lower than the mean showed an temporary increase during and after gameplay to aggression levels within the norm, and a third group showed no change at all between their pre and post-gaming session scores. The researchers classified these three profiles as “Manager” (those who showed a decrease in aggression levels), “Hood” (those who showed a temporary increase) and “Players” (those who showed no change).

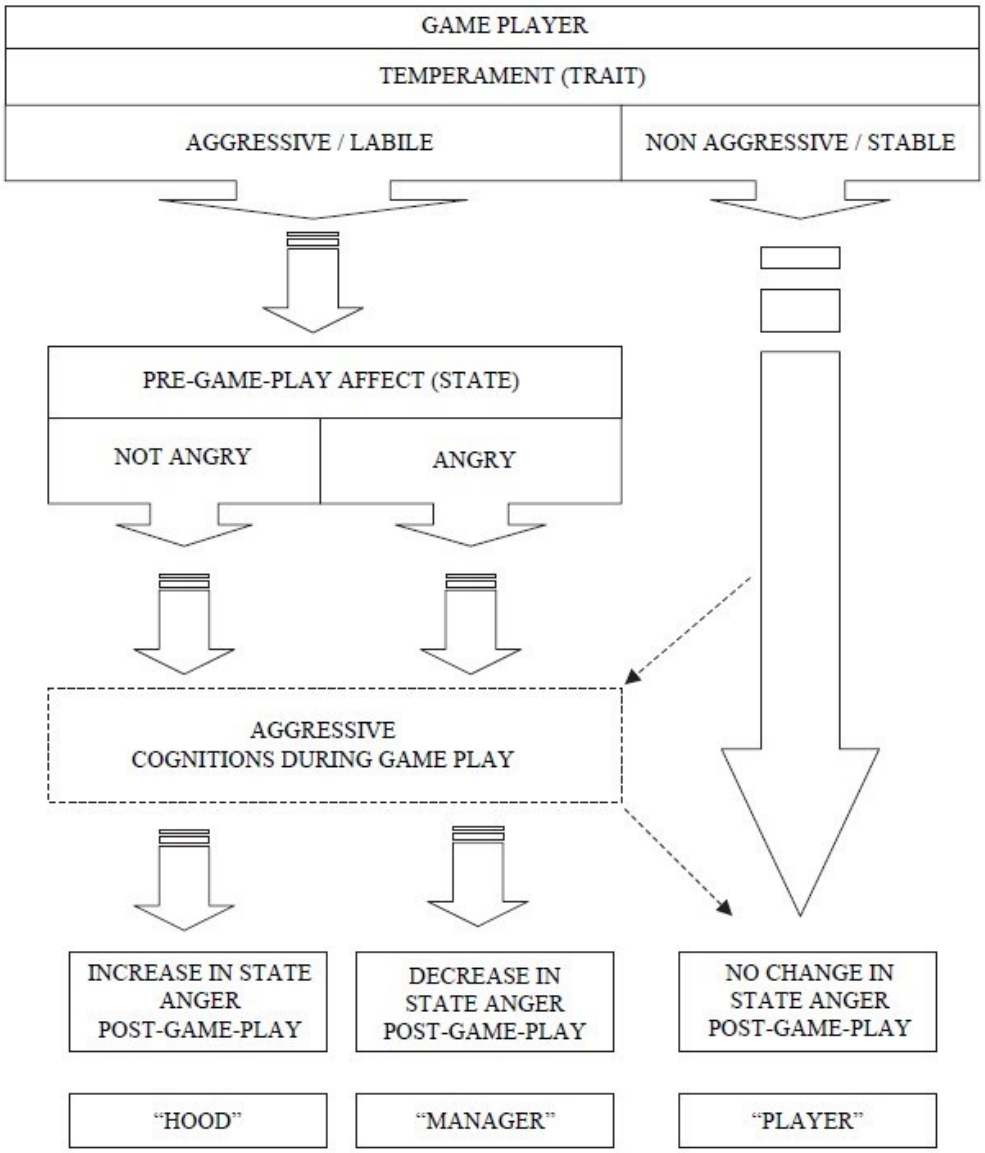

Fig 5. Derive Immersive Media prediction model of effects of violent video game play (Unsworth et al., 2007, p. 390)

These classifications came as a result of the analysis of the trends and patterns shown by the data which also indicated that the profile of a participant can be reliably predicted by their initial score in the aggression tests before playing. In other words, the initial emotional and cognitive state of the participants have a greater influence in their aggression levels than the video game, which in some cases had a cathartic effect leading to a release of tension and therefore a decrease in aggressive behaviour (Unsworth et al., 2007).

An almost opposite example can also be found in a research conducted in the Netherlands, which sought to measure the friendship quality and prosocial behaviour of adolescents after playing Mario Kart: Double Dash (Nintendo, 2003) in a variety of modes: solitary, competitively and cooperatively (Verheijen et al., 2019). Mario Kart: Double Dash is a kart racing game where players compete in racing tournaments taking control of cartoon characters; in order to win, they must be skilful drivers and use a series of items that can either power themselves up or hinder their competitors. The participants in the study played in duos and had to be friends with their gaming partner; the gaming condition (solitary, competitive, or cooperative) was assigned at random. Friendship quality was measured during and after the gaming session, as well as prosocial behaviour, with an adapted version of the two-person give-some dilemma. The researchers found that friendship quality was negatively affected for those who played competitively compared to those who played solitarily, and no change was observed in those who played cooperatively. Additionally, prosocial behaviour during gameplay predicted the improvement in friendship quality except for the cooperative condition; paradoxically, more prosocial behaviour was observed during cooperative play than in other conditions, but no effect was observed in friendship quality (Verheijen et al., 2019). Verheijen and his team theorize that this could be due to the frustration levels, negative and dominant behaviour exhibited between the players during cooperative gameplay, which counteracted the benefits of prosocial interactions during

gameplay. The source of this frustration can be found in the design of the cooperative mode in Mario Kart: Double Dash.

When playing alone, the player controls a single kart with two cartoon characters on it, one of the characters is in charge of driving and the other one of using the items, but they are controlled simultaneously by the player; therefore, they are mechanically a single unit that has been visually split on the screen. When the game is played in the cooperative mode, two players control a single kart, each of them taking control over one of the cartoon characters.

Fig 6. Two players in the cooperative mode of Mario Kart: Double Dash

Here, the game has essentially split the functions of a single player in two, giving each of the players control over half the functions. This division of labour creates a problematic relationship between the players, since the game winning conditions do not change from the single player mode to the cooperative mode. The players are expected to perform in high coordination, essentially as a single player would perform mechanically,

which means that the performance of one directly affects the performance of the other. In this arrangement, small mistakes are amplified, and their effects are felt greatly. The game is no longer providing the players with smart tools or enhancing their skills through the distribution of knowledge between the game and the players as Gee (2008) mentions it should do; rather, it is actually hindering the skills and knowledge of the players by limiting their ability to act upon the state of the game. What is important to retain from this analysis is that while the research of Verheijen and her team (2019) further show that the content of the game has no effect on the aggression levels, they also show that the interaction between the players during gameplay does have an effect on them afterwards. The quality of friendship was negatively affected for those who played in a competitive condition, essentially an aggressive interaction, and the negative interactions during the cooperative condition practically negated any benefit from the prosocial behaviour by introducing frustration and imbalance in the relationship.

The effect of the interaction between players during gameplay has also been noted elsewhere. Ewoldsen and his team (2012) conducted a research on the effect of the gameplay condition on the prosocial behaviours of the players with very interesting results. Participants played Halo 2 (Bungie, 2004), a sci-fi first-person shooter where the player takes the role of a super soldier that must fight against an invading alien force, in pairs. Each of these was assigned at random the competitive or cooperative condition, and a prisoner-dilemma task was administered after the gaming session to measure their levels of prosocial behaviour. A control group was allowed to play the game after taking the prisoner-dilemma task as to provide a baseline. The participants in the competitive condition played in either indirect or direct competition: in the indirect competition mode, each participant played independently through the single player campaign of Halo 2 and were told that whoever progressed the most within the time limit would win; whilst in the direct competition condition, the participants

played against each other in a shooting arena, were told to kill their opponent as many times as possible and whomever had the most kills would win.

Fig 7. A player shooting another player in Halo 2's competitive mode

In the cooperative condition, the participants played through the campaign in the cooperative mode; this mode is essentially the same as the single player campaign, but with two players controlling each a super soldier character and fighting alongside each other. The results of the experiment should be expected by now: participants in the cooperative condition showed significantly higher prosocial behaviours during the prisoner-dilemma task than both the competitive condition and control groups (Ewoldsen et al., 2012). The researchers concluded that the way the game is played has a greater influence in the players behaviour than the content of the game. In fact, the choice of a violent video game for the testing was a deliberate one, as they wanted to prove that the interaction between the players

is what influences their prosocial abilities and not the content of the game as we have seen before (Unsworth et al, 2007).

The difference in results of the studies between the cooperative conditions of Mario Kart: Double Dash and Halo 2 lies once again on the design of the cooperative modes. Just like in Mario Kart: Double Dash, the cooperative mode of Halo 2 requires the players to cooperate and coordinate in order to succeed; however, the key difference is that Halo 2 gives each player complete control over their own character, these avatars have the same abilities and are capable of performing the same functions, only limited by the skill of the player.

Fig 8. Two players fighting side by side in the cooperative campaign of Halo 2

By giving each player the same power to affect the game-state the players perceive their actions as consequential and important during gameplay, which helps promote cooperation and, in turn, prosocial behaviours. Coinciding with Ewoldsen (2012), we can conclude that the interaction during gameplay is one of the most important elements that contribute to a change in the players future behaviour, and must be considered as a key

element of game design, especially when we want our games to achieve a determined effect. The importance of these findings is especially relevant for serious games and educational games which tend to have a targeted effect on the players, but they are not only limited to these. All games, and especially video games, will benefit greatly from considering designing for player interaction in order to provide a stronger experience.

5.0 Designing Games for Empathy

The idea that we have developed so far, that games can be helpful when attempting to teach prosocial behaviours such as empathy, has been explored and put into practice before. Hromek and Roffey (2009) have done an analysis of games designed specifically for teaching social and emotional learning (SEL) in the classroom. Social and emotional learning is considered as a set of skills and behaviours that help people to sustain healthy intrapersonal and interpersonal relationships throughout their lives, and includes things such as emotional regulation, effective communication, empathetic behaviour, conflict resolution skills and many more (Hromek & Roffey, 2009). According to Hromek and Roffey (2009) effective teaching of SEL is a complex task since the kind of skills involved in it are often contextualized through social interactions in the real life and, as such, they consider that pedagogic models such as experience-based learning are the best to approach it instead of the more traditional instructional methods. Learning through experience poses a series of advantages for the learner, as it allows them to immediately put into practice the skills as they acquire them, experiment with different approaches, and get instant feedback on their performance (Gee, 2008). From the different experience-based learning models available, the use of games and game-like experiences are the most effective way to teach SEL to children for several reasons (Hromek & Roffey, 2009). Playing and games are one of the main learning vehicles for children as we have seen before (Piaget, 1982), not only for practical skills, but also for social behaviours from very young ages (Galet, 2014). Additionally, games that involve playing with others are themselves social experiences and provide children with the opportunity to socialize and put SEL into practice.

Hromek and Roffey (2009) have classified the games designed with the expressed purpose of teaching SEL into two different categories: circle time and therapeutic board games. The former is a series of activities that include the whole classroom, that normally

involve arranging the children into a circle and have them engage in dialogues and guided activities either with the whole group or with their adjacent classmates; for example, Class Web has students build a string web inside the circle until everyone is holding a corner. This game helps the children to visualize how they are all connected inside society and the importance of their contribution to the whole (Hromek & Roffer, 2009). Circle time games have three basic rules:

> You will have your turn to speak, when it is your turn everyone will listen to you; you do not have to say anything if you don't want to, you may "pass"; there are no put downs, no naming, blaming, or shaming (Hromek & Roffey, 2009, p. 10).

These rules are aimed at providing the appropriate social structure for positive interactions to occur that will help children to practice SEL skills safely in games like Pair Shares. Throughout the game, the children take turns to discuss and agree on two positive things they have in common with each other, which helps them to focus on their similarities rather than their differences and to practice healthy dialogue, as well as increases their sense of belonging to the group (Hromek & Roffey, 2009). The authors also make emphasis on the regularity with which circle time games should be played in order to be effective, as they mention these games should be played daily if possible as part of the regular classroom curriculum. The regularity of play helps with retention and practice of the acquired skills and provides the teachers a chance to observe any changes in the children's behaviour (Hromek & Roffey, 2009).

Therapeutic board games are, as their name indicates, board games that have been designed as psychoeducational tools to help children develop a specific aspect of SEL, they involve social dilemmas that must be resolved by the players utilizing the target SEL. These

games are normally played in small groups guided by a facilitator, either a teacher or psychologist, and are typically reserved for specific cases that require special attention. They are more focused than their counterparts and centre around themes like anger management, friendship, frustration, and others. The role of the facilitator carries a greater importance here, as they not only provide the game's framework by guarding the rules but they also must create healthy emotional environments for the game, present the activities as fun and engaging to keep motivation high, and actively explore deeper issues in the players through interventions when these arise (Hromek & Roffey, 2009).

Therapeutic board games are of special interest to this research since their structure shows several parallels to what Gee (2008) defines as "good video games". The functions of facilitators, for example, are present in most video games, as they have unyielding rules that provide a stable framework for play and present the activities of the game as fun, which is very important for video games as otherwise nobody would play them. Hromek and Roffey (2008) also mention the importance of the facilitator to debrief the players after the game, which helps them to recognize their progress and make conscious connections between their experiences in the game and those in real life. This is very similar to a results screen or a scorecard at the end of a video game level, where players can gauge their progress and evaluate their performance, helping them to improve their skills in the future. The way both therapeutic board games and video games provide feedback on the player's performance has pedagogic relevance since it is a key part of the experience-based learning model (Hromek & Roffey, 2009), as it helps to reinforce the skills the players are learning through the game. The only missing function of a facilitator in video games is the ability to intervene and explore deeper. Games are, of course, capable of reacting to the players' actions, as gameplay is essentially a cycle of reactions between the player and the game (Arsenault & Perron, 2009); this means that video games are capable of such interventions at a certain level. Albeit

limited in this ability, in a hypothetical video game for SEL, the game could stop the action and intervene as a reaction to the players' input and prompt them to reflect on what they are doing, be it positive or negative. The ability to intervene in order to explore deeper issues on the target player, however, would be almost impossible to perform inside a video game since it is entirely dependent on the observational skills and expertise of the facilitator.

Fig 9. The social & emotional competence board game, a therapeutic board game for teaching SEL (left). The talking, feeling & doing game, a therapeutic board game for psychological evaluation (right)

Another characteristic that Gee's good video games (2008) share with therapeutic board games is the way they distribute knowledge and skill. Therapeutic board games usually include one or more SEL-competent players that act as guides for their less competent peers by helping them in finding solutions to the dilemmas the game presents through the use of the prosocial skills it wishes to help develop (Hromek & Roffey. 2009). This is akin to the concept of "intelligent tools"; according to Gee (2008), a good video game will distribute the

knowledge required to succeed between the game and the player. Gee (2008) gives the example of a tactical combat game where the player commands a special-ops team through a series of missions. Here, the characters the player commands are the intelligent tools, as the game imbues them with the knowledge and skills needed to fight the enemies. Actions like aiming, shooting, throwing grenades, and more are all taken care of by them, while the other skills like strategic planning and risk management are the responsibility of the player. In this way, the game provides the player with tools that have skills of their own and aid the player in the learning of the game by clearing the way for them to focus on the important skills they must develop to succeed in the game. For Hromek and Roffey (2009), the SEL-competent peers in therapeutic board games act in a similar manner by supporting the other players in their learning efforts and allowing them to concentrate on the skills they need to develop the most. Further on, the support they provide can be regulated by the facilitator (or the game) as the other players become more competent themselves and move on to other skills. Hromek and Roffey (2009) also mention that SEL in therapeutic games occurs simultaneously at different levels: the first one is the "skill-element level", in which the players learn and apply the skills required by the game in order to win; this is followed by the "intersectional" level, where the players apply the learnt skills in their interactions with the other players. This is similar to, for example, a player learning to manage resources in the real time strategy game Age of Empires II (Ensemble Studios, 2000), and then applying similar strategies to manage their expenses; transference of the skills the players learn in the game to real life is the ultimate goal of therapeutic board games and it follows the way video game players learn (Arsenault & Perron, 2009; Gee, 2008; Perron, 2006).

Finally, both circle time and therapeutic board games put a heavy emphasis on the interactions between players as a catalyst for the effective acquisition of SEL. Circle time games focus mostly on helping the players to develop healthy relationships with their peers,

and by consequence, with society at large. They achieve this through dialogues and guided activities that encourage the children to interact with each other in positive ways (Hromek & Roffey, 2009) and these interactions are what ultimately cement the SEL skills they are learning. Therapeutic board games make an even more pronounced use of the interactions between players as these are a central mechanic of the games. As Hromek and Roffey (2009) mention, less SEL-competent players interact with more competent peers while playing in order to facilitate skill learning. The eventual transition from "skill-elemental" application to "intersectional" application of SEL is what marks the progress of the less competent players, which is only achievable through the positive interactions they have with the rest of the players. The importance of the interactions between the players is quite clear, and the same principle is also valid in the case of video games as we have explored before (Unsworth et al., 2007; Verheijen et al., 2019). The type of interaction players have will ultimately determine the degree to which prosocial behaviours such as SEL will be acquired by the players, and just as therapeutic board games, video games are also capable of harnessing this principle to elicit the development of empathy in children.

Under the umbrella of the program Values at Play, Belman and Flanagan (2010) had conducted research on video game design for eliciting empathy. They have centred their efforts, working with game designers and students, on investigating how different elements of game design can increase the efficacy of video games to foster empathy. As a result of their research, they have developed four design principles that may help game designers to better focus their efforts to elicit prosocial behaviours such as empathy on their players. The usefulness of video games for this purpose has already been well established throughout this work; nevertheless, Belman and Flanagan (2010) offer some additional insight on this regard, as they consider video games to be particularly useful for promoting behaviours like empathy due to their capacity to facilitate experiences from a different perspective. As Lessard and

Arsenault (2016) mention, this is especially true in the case of video games that include characters that the players take control of. These avatars act as a proxy of the player inside the game world, extending their experiences beyond that of what is physically surrounding them. These proxies can even be considered as subjective interfaces, which means that their view of the world, and by consequence that of the player, is biased and it can be controlled by the designer. This mechanism, according to Perron (2009), is what allows horror video games to provide such embodied experiences and elicit strong emotional responses from their players, when the game characters are fighting zombies or being chased by shadowy figures the player is effectively undergoing the emotional experience in lieu of the playable character and this extends to some physical reactions as well, such as goose bumps or agitated breathing. It follows then that if video games are capable of promoting these extended embodied experiences from a specific perspective to elicit strong emotional responses in horror video games, then they are perfectly capable of doing so to elicit other emotional responses that help promote empathy in any variety of game genres.

The design principles proposed by Belman and Flanagan (2010) are intended to be considered by game designers as guides that help inform their decisions throughout the design process rather than restrict them to a limited set of resources, and are applicable to a wide variety of video games from commercial games to educational or serious games. Principle number one reads as follows:

> Players are likely to empathize only when they make an intentional effort to do so as the game begins. The game may explicitly ask players to empathize, or it may more subtly encourage them to take on a focused empathetic posture. However, without some kind of effective empathy induction at the outset, most people will play "unempathetically" (Belman & Flanagan, 2010, p. 9).

This first principle is derived from the review of a series of observational studies and experiments where participants were exposed to educational video material (documentaries, interviews, etc.) about vulnerable populations such as homeless people and HIV-positive individuals, during which half the participants were instructed to actively try to empathize with the people they would watch on the videos and the other half were not. The researchers found that the participants that were prompted to try and empathize prior to watching the videos showed a greater change in their opinions and attitudes towards these vulnerable populations (Belman & Flanagan, 2010). The authors propose that video game playing works in a similar way to watching a video, in the sense that people are not naturally inclined to empathize with every individual that appears on the screen at a conscious level; while the emotional reactions derived from affective empathy are always present, it is important to prompt the players to engage empathetically at a cognitive level. This is what Belman and Flanagan (2010) call “empathetic play”, which can be described as a state of mind where players are consciously trying to empathize with the characters in the game, drawing similarities and trying to take their perspective while playing. The capacity of video games to do this effectively is present in many areas, from instructional levels and educationally structured level design (Gee, 2008), to the use of the subjective nature of playable characters as player proxies (Lessard & Arsenault, 2016).

Moving on, we have the second principle where the authors talk about providing solutions: “Give players specific recommendations about how their actions can address the issues represented in the game" (Belman & Flanagan, 2010, p. 10). This principle comes from the theoretical review by the authors, during their research they found many references and theoretical writings on the effects of unresolved empathy. According to these, when individuals go through an empathetic process that involves strong emotions, especially negative ones like sadness or suffering, a natural desire to help arises on the subjects. This

desire is often fulfilled in most situations with simple or obvious solutions. Nevertheless, in some cases where the actions needed to help are not evident, the lack of resolution of the internal conflict can lead to frustration, and in turn, this frustration may lead to a future avoidance of empathetic feelings and behaviours as a defence mechanism (Belman & Flanagan, 2010). The implications of this phenomenon on video game design is fairly simple: if the desire of the game's designer is to teach their players or to promote a certain behaviour or response, like it is in the case of the theoretical exploration we have developed so far, the game must provide the answer to the conflicts it presents. This is not to say that the game should give their players the solutions to every problem whenever the player meets a dead end, but to do as the therapeutic board games that include competent peers in the play group that can provide assistance to the learning players for them to reach correct and satisfying resolutions of the game's conflicts, and thus avoiding the detrimental effects of frustration (Hromek & Roffey, 2009). However, designers should be careful when providing such tools to the player. As Lessard and Arsenault (2006) mention, video games often gain from complication and uncertainty for providing interesting and engaging mechanics, so the delivery of this assistance must be carefully considered to avoid any conflict with the general flow of the game play.

Continuing with the importance of cognitive and affective empathy, we find the third principle:

> A short burst of emotional empathy works well if desired outcomes do not require significant shifts in how players' beliefs about themselves, the world, or themselves in relation to the world. But if these kinds of shifts are a design goal, the game should integrate both cognitive and emotional empathy (Belman & Flanagan, 2010, p. 10).

This third principle stems from the researchers' own expertise and experience from working with professional and student game designers, through which they noticed that people would be affected in different degrees by the same games in the long term, even when they showed very similar impacts in the short term. Belman and Flanagan (2010) theorize that this occurs due to the difference in the players' personal beliefs. When exposed to a game that aims at moving them emotionally in order to produce a change in their future actions or behaviour, players with personal beliefs that better align with the desired change are more likely to engage in long-term changes than those with more distant beliefs. This occurs mainly due to the way the game is eliciting the change, as most games utilize emotional distress as a catalyst for change; by shocking the audience with sad or cruel stories of reality, the designers hope to make their point across and encourage the player to take action. However, this initial emotional shock has little perduring effect when it is divorced from the cognitive process. While it is true that both cognitive and affective empathy are always present (Hoffman, 1985; 2000; 2001), they are capable of operating independently within each individual (Gini et al., 2007; Ritter et al., 2011; Rogers et al., 2006), which leads to the inconsistency in the long term results of interventions such as games for eliciting empathy. Engaging both cognitive and emotional empathy effectively at the same time should be a priority to the designers if they desire to elicit a persistent and long-lasting effect on their players. This may be done not only through the relationship between the players and the game, but also that amongst the players.

Finally, we find the fourth principle as follows:

> Emphasize points of similarity between the player and people or groups with whom she is supposed to empathize, but beware of provoking defensive avoidance (Belman & Flanagan, 2010, p. 11).

The fourth and final principle comes again from the experience the authors gained during their research time working with designers and students. They observed that cognitive empathy came more easily to the players when the games presented similarities between the characters and the players. Whether these similarities were intentional or not, their presence helped to break the natural in group-out group predisposition and thus facilitated the empathic connection between the players and the target characters. Belman and Flanagan (2010) warn us about this, as they observed that in few but relevant cases this same condition provoked defensive avoidance which is contrary to the desired result. They point out a particular case where female participants showed negative attitudes and behaviours towards HIV-positive individuals after watching videos of them retelling how unprotected sex resulted in contracting the virus. The adverse reaction of the female participants is explained as a defence mechanism; since many of them had engaged in similar behaviours as the HIV-positive individuals on the screen, they would unconsciously choose to distance themselves from them both cognitively and emotionally, resulting in defensive avoidance (Belman & Flanagan, 2010). This does not mean that any empathy towards the interview subjects was lost; in fact, the empathetic connection was very likely a strong one, but this does not always result in positive reactions (Gini et al., 2007). The implication from this is that designers must be mindful of their character design choices if their goal is to make the players empathize with the people or groups depicted in the game. While very obvious or direct similarities are easy to provide and can be useful, they can also lead to defensive avoidance effectively negating any possible benefit. Providing a wide array of characteristics in the characters can provide better and more subtle ways for the players to relate to them.

As we have explored, designing games for empathy is a complex affair as it must consider not only the internal processes of the individuals at play but also the external ones between them. The social dimension of the gaming experience becomes just as important as

the individual one and, as such, games that are socially contextualized are more effective at the desired task (Hromek & Roffey, 2009). Especially in the case of pro social behaviours such as empathy, this allows for better skill transference between the game and the real world (Gee, 2008; Hromek & Roffey, 2009) aided by the presence of intelligent tools (Gee, 2008) that allow the players to focus on the development of empathy without being encumbered by other tasks. Additionally, retaining the lessons learned from Belman and Flanagan's (2010) second and third principle will inform aspects of game design as well, as engaging cognitive and affective empathy in equal measure stands out as key in order to elicit a lasting change in the development of empathy. Applying these concepts to the structure of video games will be essential to elucidating the central thesis of this research as we move forward.

5.1 Video game Design Considerations

After considering the theoretical and empirical information we have explored thus far, we are now ready to answer the central questions of this research. What should video games that aim at eliciting the development of empathy in their players do? We can approach this question from the perspective of the heuristic spiral proposed by Arsenault and Perron (2009) and divide the video games into the three dimensions proposed by their model. Starting at the narrative level, the explicit presence of empathy is dependent on the type of video game one wishes to design and the chosen approach to the subject matter. Narrative-driven games that lean heavily on the value of the story will find greater benefit in clearly showing empathy in the narrative than more gameplay centric games. Elements like character design (Belman & Flanagan, 2010), story beats and setting (Lessard and Arsenault, 2016; Perron, 2009) must reflect the point of view in respect to empathy that the designer wishes the players to take. Like Lessard and Arsenault (20016) mention, these will act as a subjective interface through which the game will compel the players to view and interact with the world in a specific way,

integrating the expected interactions and behaviours with the rest of the game elements in a natural and effective way. Other important tools for effectively eliciting empathy in players like interventions (Hromek & Roffey, 2009) and prompting (Belman & Flanagan, 2010) also find a home in the narrative dimension. Worldbuilding and non-playable characters are especially useful here since these are ways in which the game can speak directly to the players and guide them into reflection and consideration of their actions. A great example of this can be found in the Star Wars-themed role-playing game Knights of the Old Republic II: The Sith Lords (Obsidian Entertainment, 2004) or KOTOR II for short. Throughout the game, the player is presented with a series of moral dilemmas they can choose to resolve as they wish, often picking from either morally good or bad actions. After each one of these decisions Kreia, one of the companion characters, enters into a dialogue with the main character where she points out the repercussion of their decision and discusses their moral implications, essentially prompting the player to reflect around their own morality as it is expressed through their actions in the game.

Fig 10. Kreia offers advice to a player after denying help to a beggar, dialogue in the image is as follows: “Cruelty leads to suffering. And when one suffers it is the way of life to spread suffering.”

Contrary to what it would seem, these considerations do not limit the number of settings or the type of stories available for an empathy-centric game. As we have discussed before (Unsworth et al, 2007), it is absolutely possible for a video game to expose their players to action-packed and even violent content while helping promote prosocial behaviours such as empathy as long as other elements like narrative framing and interactions are pointing to that direction.

Furthermore, at the gameplay level, we find perhaps the most important collection of tools at the designers’ disposal, as this is by definition the core of a ludic experience such as a video game. The most important idea to retain here is that video games that want to elicit empathy, or any other prosocial behaviour for that matter, must present it as one of the main

mechanics in the game. This means that the players must exercise it through gameplay and actively engage with it while they are playing (Gee, 2008), and not only read or hear about it. In this way, the designers will take advantage of the learning paths naturally present in ludic activities and enhanced greatly by the efforts of the designer (Arsenault & Perron, 2009; Gee, 2008). If applied correctly, the skills acquired through and for the game will follow the same path like those taught through therapeutic board games and go from the skill-element level, skills learnt for playing the game, to the intersectional level, game skills applied to real life (Hromek & Roffey, 2009).

This can be achieved via two different ways, but ideally both should be present to maximize the efficiency. Firstly, the desired prosocial behaviour, in this case empathy, must be one of the design pillars of the mechanical design of the video game and it must be expressed through the available actions that the player can perform inside the game. Going back to the KOTOR II example, the interventions of the Kreia character would lose almost, if not all of, their educational potential if not preceded by the player making a moral decision and acting upon the game: it is not enough to hear about it or to witness it, the player must engage with the skill and use it in order to interiorize it. This is what Belman and Flanagan (2010) refer to when they mention that cognitive empathy is just as important as affective empathy if the designer wishes to create a long lasting effect on the player; the cognitive engagement of the player is facilitated by the gameplay mechanics and then reinforced through affective prompts in the form of interventions, story moments or interactions. The second way, and perhaps the strongest one of the two, is by the way of player-to-player interactions. The way human players are allowed or pushed to interact with each other by the game is even more important than the interactions they have with the game and its characters. (Ewoldsen et al., 2012; Unsworth et al., 2007; Verheijen et al., 2019).

We can say that designing the game in such a way that it makes the players interact with each other through empathetic actions is the most effective way of eliciting a change in them. Using video games in this way, as social regulators for player-to-player interactions, is one of the strongest and most underutilized assets of video games. While it is possible to achieve change through solitary experiences (Belman & Flanagan, 2010), this is mainly applicable to older subjects, often young adults or older. For achieving such changes in children, the use of social settings and experiences is much more effective (Hromek & Roffey) and it is a much more suitable moment from a developmental point of view for such an intervention (Piaget, 1951; Hoffman, 2000, 2001). On the same track, we find the importance of debriefing and feedback (Hromek & Roffey, 2009). The game must communicate to the players how much they are advancing in their acquisition of the skill and what they can do to improve further, this is natural for most well-designed video games (Gee, 2008) as most of them offer a way to track the progress of the players through the accumulation of experience points or by giving them a score at the end of each level, for example.

Finally, we have the hermeneutic level, which pertains to the players' symbolic interpretation of the game. At this level, the designer has a reduced amount of control as opposed to the prior two levels, since the interpretation depends on the view of the player; however, there is always an attempt from the designer to guide the player towards a desired symbolic interpretation, which is expressed through the game design as intentional statements. In an ideal situation, where the latter two hermeneutic levels have been executed correctly, a hermeneutic interpretation of the video game will inevitably point into the direction of empathy and interactions between players as the key to achieve it. The task of the designer is then to seamlessly weave strong mechanical and interaction design with the fun and engaging experiences that video games can provide, as to create an effective and

approachable learning experience that will elicit significant and long-lasting changes in the empathic developments of their players.

6.0 Video game Design Analysis

What follows is an analysis of a commercially available video game that shows many, but not all, of the characteristics that we have previously determined a video game designed for eliciting empathy should have. The purpose of this analysis is to gain some insight on what is currently being done in video games designed for the commercial market and offer some recommendations on how they could be improved building on the theory that we have developed so far. A detailed description of the game will be followed by an analysis of its design and a series of possible changes or additions will be proposed.

6.1 Methodology

The analysis proposed in here will dissect the game in two of the three categories delineated by Arsenault & Perron (2009) in their heuristic spiral, namely the gameplay or mechanical dimension and the narrative dimension. These two have been chosen since they are the ones where the designer has the strongest influence during the design of the game. Specific elements such as game mechanics, characters, level design, and story will be evaluated on their function within the game and in what measure they help to elicit empathy development according to the design considerations that we have delineated in the preceding chapters. Especial emphasis will be put on the mechanical role of cooperation as a key component of the game, and how the aforementioned game elements function in relation to it, and more specifically to what measure said elements fulfil the characteristics we determined to be necessary (Gee, 2008; Hromek & Roffey, 2009; Belman & Flanagan, 2010). Along with this analysis a series of changes or additions will be suggested in order to improve the quality of the game as a tool for empathy development according to the design concepts that have been developed thus far. The observations from which said analysis has been derived were conducted through several methods. Most of the information was collected first-hand through

play sessions, both in single player and multiplayer modalities of the game in order to experience the full range it was capable of offering. This information was further complemented by watching the playthrough of other individuals via video on the web platform YouTube. The recordings were both part of reviews of the game by press outlets as well as recorded play sessions from consumers. The initial impressions were then contrasted with design documentation from one of the designers of the game pertaining the purpose of certain game elements and mechanics and these were evaluated in order to find out how well the purpose of the designers was accomplished. The analysis presented here is not data driven so it does not present any numerical values on its categories, instead it is derived from the experience of the researcher and based upon the theoretical framework that has been developed thus far.

6.2 Research Limitations

The main limitation for this research is the analysis of only one video game. While it is true that a greater number and variety of games would have been desirable, limiting the analysis to only one allows us to go about it in greater depth and detail, additionally not many video games exist that would fulfil the base characteristics of what this research is looking to elucidate. We believe that the analysis conducted here will provide valuable insight on the current state of design on the video game industry and to what extent possibilities as the ones described throughout this work have been explored and utilized. The information that will be gained from this will be of great use to future researchers and designers who wish to build upon the work presented here.

6.3 The Design of Overcooked

Overcooked is a casual cooperative cooking game for one to four players developed by the British studio Ghost Town Games and published by the also British Team17 publishing company. It is available on several platforms including PC, PlayStation 4 and the Nintendo Switch. Released originally during the summer of 2016, Overcooked was well received by the public and the critics, even earning several nominations to various awards and winning in the categories of Best Debut Game from The Independent Game Developers Association (TIGA) Games Industry Award, Best British Game and Best Family Game from the 13th British Academy Game Awards, awarded by the British Academy of Film and Television Arts (BAFTA).

The game puts the players in control of a cartoon chef team tasked with preparing and delivering as many dishes as possible before the time runs out. The game awards players with points depending on the quality of the dishes and gives them a final rank in stars with a maximum of three stars per level. The game includes a story mode with 30 missions where the player must prepare and deliver food in increasingly difficult conditions with small variations in recipes. Each level presents the players with different challenges, most of them revolving around the layout of the level. As the game progresses, the kitchen where the chefs are cooking will become increasingly chaotic, featuring obstacles such as moving counters, conveyor belts, slippery floors, and more.

Even though the game can be played in single player mode, this is to say by only one person, it is noticeable that cooperative gameplay is at the core of the game's design since there are at least two playable characters at all times. In order to play alone, a single person must switch control between the two characters and control them independently. This quickly proves to be challenging since each character has to perform different changing actions in order to play effectively, adding the race against the clock and the challenge becomes a

daunting task for a single player. This is no accident, as described by one of its creators, Phillip Duncan, in his article (2016) on the design of Overcooked. They started with the idea of cooperation as the guiding principle for the game's design, deciding to focus on the interaction between the players over other elements. The game puts a particular emphasis on communication and teamwork as they are absolutely required in order to complete the levels.

Fig 11. The start of a level, the first recipe is on the top left corner, on the bottom left the points are represented by a coin and on the bottom right we find the timer

A typical level in Overcooked follows a very simple sequence of events: orders come in describing the ingredients and preparation needed, players prepare the dishes by chopping, cooking, and plating; the orders are delivered and dirty dishes come back to be washed and repeat the process. Orders require anywhere from one to four ingredients that need to be cooked in some way or another, like chopping, frying, boiling, etc. The controls are kept as simple as possible: the developers have chosen to use one button for picking up and putting down things, one for cooking, and the thumbstick to move around. When an order comes in,

it is placed at the top left corner of the screen, showing the dish to be prepared and a breakdown of the ingredients required, as well as how to cook each one. A bar on top of the recipe slowly decreases in size and changes colour, from green to red, indicating how much time is left to deliver the order. The sooner the dish is delivered, the more points will be gained; if the bar depletes completely, the order disappears, and points are deducted. Precision is also important, as delivered dishes with missing or extra ingredients will award no points and, probably even more importantly, they cost valuable time to the players. Orders quickly pile up, requiring the players to work fast in order to keep a good pace and prevent accidents. Food can catch on fire if left to cook for too long, and they can even run out of clean dishes if they are not washed constantly. The game will continue to produce new orders until the time runs out; when this happens, the level finishes, points are tallied, and the final score is awarded. Each level has a minimum score required to succeed: if this score is not met, the level is failed and must be repeated; in the opposite case, the players are awarded a number of stars and they are free to move on to the next stage or repeat and try to increase their score.

Fig 12. The results screen shown to the players after finishing a level, the final score is expressed in points and stars

Duncan (2016) describes how the different elements in the game's design push the players towards cooperating; he breaks this down to three main categories: number of tasks, delays, and disruptions. During the early stage of development, the designers had conceived several kitchen layouts that limited the players movement with the goal of preventing them from trying to prepare single orders individually. These layouts would make the process of getting ingredients, cooking, and plating unnecessarily long and difficult, causing players to block the way, bump into each other or simply running out of time on the orders. This approach proved successful in driving the players into the intended play of the game, this is, to divide the cooking labours and perform actions in coordination with the other players for completing the incoming orders, much like in a real kitchen. Nevertheless, a new problem arose: now players were falling into a single role for the whole level; although they were now operating as a unit, the assembly line nature of this division of labour reduced the interaction between the players and the game significantly, turning more into a mechanical challenge rather than a cooperative challenge. The gameplay was now more about how well a player can perform a specific action for a determinate amount of time, rather than how well can a group of players cooperate and communicate to complete the task at hand.

In order to reorient the gameplay towards their original goal, Duncan and DeVine decided to increase the number of tasks so that they would always be greater than the number of players, which would force the players to constantly switch between different tasks to keep a good rhythm and beat the level. A good example of this is washing the dishes: this little detail not only adds a fine layer of realism to an otherwise cartoonish game, but it serves the purpose of forcing the players to divide their attention and thus keeping the momentum of the game going. Having to constantly move and change tasks, players are now required to communicate at all times with each other, and their interactions become their main tool to

beat the game. Delays on the time the actions on the game took were also implemented for balancing the amount of attention a player would commit to a specific task.

Fig 13. A still from Overcooked showing the kitchen catching on fire

The players are then required to make a choice between devoting more time to a specific task or keep themselves busy with something else; the importance of this decision is further emphasized by the built-in risks that the game presents (Duncan, 2016). If, for example, a pot is left too long on the stove it will catch on fire, the flames can then spread around so they must be extinguished or risk the whole kitchen catching fire. These types of decisions keep the players focused and stop them from falling into mechanized patterns. During later stages of game development, the designers introduced a series of disruptions throughout the levels; their inclusion was in response to the playtest feedback, where they noticed that players enjoyed staying alert and responding to changing levels (Duncan, 2016). This saw the addition of levels with moving platforms and changing layouts that kept the dynamism of the levels, further reinforcing the cooperative aspect of the gameplay, as the

disruptions cause the players to communicate constantly and work together to stop disaster from conquering the kitchen.

The design process of Overcooked was, in a way, also based in cooperation. Being a development team of only two people with very limited resources, Ghost Town Games had to explore unconventional methods for the testing and quality assurance steps of the development process. As detailed in an interview with Dring (2017), the developers frequently took early builds of the game to video game expos asking people to play them and give feedback. This process gave the team direct access not only to the information needed to improve the design of the game, but also to the public that would eventually become their target audience. The suggestions and complaints received during these expos informed their design decisions and they tried to implement them as soon as possible, sometimes during the events, producing new builds along the way:

> "I had my laptop at the side and I would hot fix stuff and upload a new build to the machine," he says. "In the early conventions we had those issues where you put the game in front of people and they'd play it in a way you weren't expecting." (Dring, 2017)

This process is very close to that of co-design, a design methodology that focuses on collaborating directly with the end user by integrating them into every step of the design process, from ideation, to testing and implementation. According to Durl and team (2017), co-design has been heavily utilized in service design, but it can also be successfully used in the development of software-based experiences. During the development of a virtual reality experience to educate adolescents on alcohol consumption, Durl and his team found that the

information gathered through co-design activities significantly improved the quality of the final product and the engagement levels of the target audience. Although the design process of Overcooked did not follow the full methodology of co-design, the way the designers approached testing and feedback helped them to polish the game continuously, ensuring that the core design mechanics were always successfully communicated to the players.

6.4 Overcooked 2

Two years after the release of Overcooked, Ghost Town Games launched the sequel title Overcooked 2, developed in part by their publisher Team17. The overall gameplay and mechanics remain largely the same: players are still expected to cooperate and communicate efficiently in order to succeed in the increasingly chaotic levels. However, both recipes and level design are more complex, especially in the later levels. Some recipes now require two cooking steps before plating, like in the case of pasta where the sauce and the spaghetti noodles are each cooked separately before combining them; and burritos, which require rice to be cooked and meat fried before serving. The changes in level design appear in the increased complexity of navigation, now featuring teleporters, multiple conveyor belts, moving vehicles, and inaccessible areas alongside the use of evolving stages. While in the first instalment in the series each level was constituted by a single kitchen, some levels in Overcooked 2 include two kitchens, each with a different recipe. A new mechanic was also introduced to help players deal with the new challenges: characters are now able to throw ingredients around, which not only cuts the time it takes to move ingredients around the kitchen but it becomes a necessary skill in later levels, as some of them separate the players into areas that are completely inaccessible from one another. According to the designers, the changes to the recipes were done for variety, but the increase in level design complexity comes from the feedback they gathered after the release of the first game:

> "A lot of the time, the things that made players laugh and cry wasn't having difficult-to-understand and prepare recipes," says Team17 lead designer Gavin Hood. "It was those moments in stages where everything changes; that point at which the kitchen you're cooking in starts to work against you." (Garst, 2018)

Even with these changes, the core of Overcooked 2's gameplay continues to be on the cooperation abilities of the players, and the game remains equally accessible as the first one at a mechanical level. Probably the biggest change introduced was the addition of online play, which was very well received by critics and players (Orland, 2018). While Ghost Town Games is still a very small independent studio comprised of only three people, they worked together with Team17 for the development of Overcooked 2 and, as a result, they were able to introduce features such as online play and evolving levels. The inclusion of online play comes as a response to the playerbase petition; while the designers' original intent was to replicate the local multiplayer experience of older games, they decided to include it after testing the online implementation developed by Team17. According to an interview with Duncan and DeVine (Dring, 2018), the gameplay experience remained the same while playing online and the interactions between players remained important for them to cooperate efficiently. This was done by including a voice-chat function which lets players communicate in real time. The only platform where this function is not available is the Nintendo Switch, in which a series of emotes are used to convey different actions and ideas. This system has proven to be less efficient than voice chat as it impedes clear communication, essentially hindering the degree of cooperation achievable by the players.

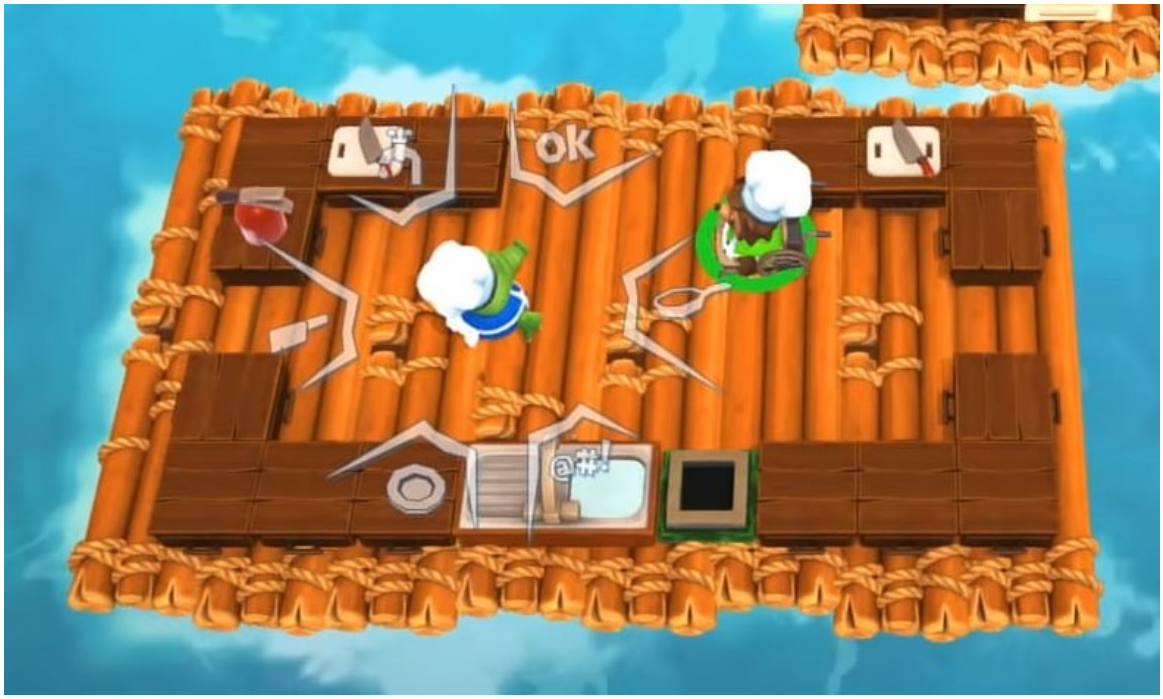

Fig 14. A detail showing the mote system of the Nintendo Switch version of Overcooked 2

Overcooked and Overcooked 2 share the same core mechanics and put the same emphasis in cooperation as the main means to reach victory. The changes present in the sequel are mainly improvements in the level design and minor tweaks to the mechanics which overall improve the gameplay experience without changing the core gameplay patterns. Cooperation and communication are still the main skills players must develop and exercise while playing to become better at the game.

6.5 Analysis and recommendations

Overcooked (Ghost Town Games, 2016) reverses the traditional paradigm of game design, where video games are primarily conceived as solitary experiences with an optional mode for sharing the experience with someone else that we can find in many games like the aforementioned Halo 2 and Mario Kart: Double Dash, by making the shared experience the primary way to play the game and the solitary experience completely optional. In this way,

Overcooked is first and foremost a cooperative game whose intended play pattern requires by definition several individuals playing together. However, this rearrangement of priorities is not exclusive to Overcooked. In the years prior to its release, other team-based games such as League of Legends (Riot Games, 2009), DOTA 2 (Valve, 2013), and Overwatch (Blizzard Entertainment, 2015) saw very successful launches. These games and many others share the characteristics of being exclusively multiplayer and online, meaning they are designed to be played cooperatively through the internet. Despite this clear trend in the market, Overcooked did not launch with an online multiplayer option to the disappointment of players and critics alike, the reason being the resources and priorities Ghost Town Games had at the time. The development team of Overcooked was composed solely by its two creators, Phillip Duncan and Oli DeVine, who had to prioritize what would be present in the game due to technical and time constraints. They deliberately chose to leave online multiplayer out mainly because they wanted to recreate the experience of playing with other people in the same room as with older games:

> Ghost Town created Overcooked out of a craving for old-school co-op multiplayer that you played with others in the same room. DeVine has two brothers while Duncan has three, and they both fondly remember those classic multiplayer experiences from when they were kids. (Dring, 2017).

At the mechanical level, this gives Overcooked an important social dimension very similar to that of SEL games (Hromek & Roffey, 2009): in both cases interacting with other players is at the core of the game. While the interactions in SEL games revolve around dialogue with players exchanging their personal experiences and points of view, in Overcooked communication is at the centre of the interaction, as the players must

communicate effectively while working together towards a common goal, which allows Overcooked to promote prosocial behaviours and help in the development of empathy. As we have seen before (Ewoldsen et al., 2012; Verheijen et al., 2019), cooperative interactions can have a positive effect on the prosocial skills of the players when executed well as is the case with Overcooked, the game treats all the players equally by giving them each control over their own character that is capable of executing all required actions to succeed in the game with the same degree of efficiency. While different characters are available for the players to choose from, they are mechanically identical, and their differences are only cosmetic; this allows the players to contribute equally to the common objective.

Fig 15. Overcooked's character selection screen showing different character models

The simplicity of the actions the characters are capable of performing (chopping, cooking, plating, washing, etc.) reduces the skill gate required to be proficient in the game, which achieves two things: first, it makes the game more approachable as it requires a lower level of skill to be able to play adequately, allowing for example younger players and even

older but casual players to enjoy the game; secondly, it keeps the attention on the interaction between the players. By making the game very easy to play, the developers can keep the communication between players as one of the main tools they have access to for winning the game. In the end, it does not really matter how dexterous someone is when playing Overcooked: their character will move, chop, and cook with the same speed and precision as anyone else's, which means that players must communicate efficiently if they desire to improve their performance. This generates a shift in the way players approach the game, as they will no longer be preoccupied with how well they can control their characters, but rather with how well they can coordinate with the other players. This play pattern means that prosocial behaviours such as communication and cooperation are essentially part of the game mechanics, and how proficient players are with these will have a direct impact on their performance in the game. This aligns with the design considerations we had delineated before: by designing the game in such a way that communication and cooperation are the main mechanics, Duncan and DeVine have created a ludic experience that will very efficiently help to elicit empathy in their players through the exercise of related prosocial behaviours. Once the players have become sufficiently proficient at the skill-element level, they will be ready to move on to the intersectional level and start applying their improved communication and cooperation skills outside the game (Hromek & Roffey, 2010). The design of the game can be further improved in this area by providing the players with some guidance when they underperform. In its current state, the game will display the results screen at the end of every level showing the score in points and stars; at least one star is required to successfully beat the level. In the case the players are unsuccessful, the game will simply show them their score, but no advice is offered as to how they can improve, and the players are left to their own devices.

Fig 16. Results screen showing a failed level

Simple advice can be added here that encourages the players to communicate more while playing, encouraging them to share their ideas about strategies and to also listen to their teammates when they are trying to communicate with them. According to Belman & Flanagan's (2010) second design principle, this type of intervention will help guide the players to the desired development of the prosocial skills they require and will in turn help develop stronger empathetic attitudes towards their peers by providing them specific solutions in the shape of advice. For instance, a small cutscene of the Onion King reminding the characters that communication is more important than cooking skills to win the game would effectively utilize the game's assets to communicate the idea of cooperation as the central mechanic in a more explicit way. Messages with recommendations on how to better cooperate with your team during loading screens at the end of a failed level are another possible solution, however simple it may be. These interventions will become more effective the more ingrained they are into the fabric of the game: from the two former examples the second one is more superficial as it is essentially tacked-on to what could be considered is not

part of the actual game, while the first example takes full advantage of the narrative capabilities of the game to communicate the desired idea.

Cooperation and teamwork are not only emphasized by present features in Overcooked, but also by those missing. The game, for instance, has no individual scoring and in fact does not track any individual actions from the players. The score is given as a single number awarded to the whole team and no distinction is made between individual contributions to the overall success of the team. This reinforces the idea of cooperation in the players' mind and can make them more mindful of how they are part of a team and are treated as such, much like the SEL game Class Web we have discussed before (Hromek & Roffey, 2009). Originally, the game was based on a lives system, with each player having three lives at the start of the level and losing one life whenever missing an order; the levels would continue indefinitely producing more and more orders until all the lives were lost, much to the style of older arcade games like Pac-Man or Tetris. The designers decided to move away from this system, as they found out that it considerably decreased the motivation of players because they felt as if they were constantly failing (Duncan, 2016). The change to the current scoring system gives the players a greater sense of accomplishment and makes the game more fun and enjoyable as it essentially shifts from *How much can we do before inevitably failing?* to *How high can we reach before the time runs out?*. Under the current scoring system, the game also discourages internal competition since there is no first place or top score within the team; it reinforces the idea of cooperation as the main game mechanic since the players are effectively treated by the game as a unity, a true team with no sense of individual performance or accomplishment. To the game, the individual contributions of each player hold no weight and it distributes blame and glory evenly between all players, increasing the sense of solidarity and teamwork. The only way for the players to become

better at the game is to become better team players, and this skill will eventually transfer from the game skill set to the real-life skill set of the players.

At a narrative level, Overcooked also expresses the idea of cooperation and empathy, and taking another look at the character design we can find some examples of this. As we have discussed, the designers decided to make all the characters mechanically identical with the purpose of keeping the game simple and encouraging players to rely more on their communication skills rather than on special abilities or character stats in order to win; however, this does not mean that all the characters are the same. Overcooked offers a varied selection of characters making an emphasis on diversity: we find chefs from different sexes, ethnicities and even some with disabilities. At first glance, this could seem as only an effort for inclusion and wider representation of minority groups, but there is a deeper message at play here. By showcasing this diverse cast of characters that share the same abilities despite their differences, it sends the message to the players that these differences are not important, and that everyone is inherently capable of performing equally. While this message is by itself excellent, the way it is delivered can be improved; for example, a message in the character selection screen stating that all characters are equally proficient and that their physical appearance has no effect on the game would be a subtle, but effective way to reinforce the message as Belman & Flanagan (2010) mention in their game design principles.

Fig 17. Some of game characters, notice the variety in ethnicity, age, sex, and more

The in-game story of Overcooked also shows some good characteristics regarding the reinforcement of empathy and other prosocial behaviours. At the beginning of the game, the Onion King tasks the team of chefs with the mission of saving the world from destruction at the hand of the antagonist, a spaghetti monster. The monster's motivation is simple: he is hungry and will consume anything and everything in its path until it is satisfied. The best sign of an empathetic narrative comes with the solution the Onion King proposes: to deal with this world ending threat, he tells the players they shall prepare the best possible food for the monster and feed him until he is satisfied, and warns them that if they wish to be successful they must perfect their cooking and cooperation skills. The solution proposed by the game is, at a very basic level, to work together and essentially help the spaghetti monster to fulfil a very basic need required for his survival, that of eating. Other games could have gathered a team of soldiers or magicians and asked the players to fight the spaghetti monster and destroy it, which is not wrong in and of itself, but the approach Overcooked takes towards this conflict is much more empathetic and works just as the therapeutic board games we have

mentioned before, by taking a conflict and proposing to the players an SEL based solution. The effectiveness of the narrative can be improved in this case by making what we have just described more evident in the game: the dialog lines of the Onion King could mention how other worlds have tried to fight the monster and failed; or that he has determined the monster is simply hungry and that rather than attacking him they should help him because, most of the time, those that harm are themselves hurting.

Fig 18. The onion King urging his team of chefs to work together to feed the spaghetti monster

While empathetic narratives like this one are not obligatory on video games designed for empathy, they can be of significant help, especially to avoid ludo-narrative dissonance where the game's mechanical dimension is not in line with its narrative dimension (Belman & Flanagan, 2010). Even though this is not a terrible situation, in the vast majority of cases having both dimensions working in concert is certainly good practice and can only enhance the effectiveness of every other design element in the game.

As we can see, the changes suggested that could improve the effectiveness of Overcooked as a game that will elicit empathy are most of the time subtle and do not change the core of the game. This is mainly due to the design principles followed by Duncan (2016) and his team: having cooperation, a highly prosocial behaviour deeply connected with empathy, as the main design goal, allowed them to create a game that leverages the educational potential in video games to the betterment of its players. We propose that this same structure can be replicated in many ways and for many other prosocial and SEL skills. Together with what our research suggest, that games like this should do, we could arrive to an exciting area of video game design that understands more, not only about how games work, but how people play them and take advantage of this knowledge to create exciting and efficient games for good.

6.6 Discussion

Having a deeper understanding of how people play games is an invaluable tool for designers, as this allows them to think not only in terms of the game system but also on how it interacts with its players, and how players interact with one another. These interactions are as much part of the game as its characters and settings are and, by consequence, they must be in the mind of the designer throughout the design process, hence the need for studies such as this one which can help to shed some light on this area. Furthermore, understanding the interactions between players opens the possibility for video games to be used as psychoeducational tools for the betterment of their players by eliciting pro social behaviours such as empathy, as we have suggested along this research.

Concentrating on one game has allowed us to understand its inner workings to a great deal of detail and offers the advantage of precision in the research scope. It is important to understand the whole of the design process in order to correctly evaluate the potential of a

video game as a psychoeducational tool since said potential will be determined in great part by the core design elements which are defined very early on during the design process. This emphasis allowed us to better identify the key elements and decisions that led to the successful design of Overcooked. However, the analysis of other video games, both commercially available and serious games, under the criteria delineated in the previous sections would have enriched this research by providing a wider panorama of the state that video game design is currently in, helping to identify the areas where innovations like the ones proposed could be useful.

Overcooked exhibits to varying degrees many, although not all, of the characteristics that a video game that wishes to elicit empathy in their players should have. The mechanical dimension follows the social models of multiplayer-cooperation present in SEL games, which according to Hromek and Roffey (2009) facilitates the acquisition and development of pro social behaviours such as empathy, particularly in younger individuals. This mechanical approach also coincides with the observations of Brownell (2002) regarding cooperative play as according to her work, cooperation during play allows children to connect at an emotional and cognitive state where they share a common conceptual space. In this regard, the utilization of cooperation and communication as core gameplay mechanics as exhibited in Overcooked is ideal for the stated purpose. At the narrative dimension the game also achieves several of the design principles delineated by Belman and Flanagan (2010) through its character design and overall story. Although it can be improved, particularly regarding Belman and Flanagan's second design principle (2010) by providing more specific advice to the players when they fail a level and remind them through narrative devices the importance of cooperation for their success. Following on these observations would greatly improve the effectiveness of Overcooked and other games that wish to arrive to a similar goal.

However, the most important characteristic of the design of Overcooked for game designers is its use of pro social behaviours as core game mechanics. While the decision of the designers to concentrate their efforts into putting cooperation at the centre of the game's design was not motivated by a psychoeducational purpose, it fulfils many of the needs that this research indicates games that want to elicit empathy actually have. By setting cooperation as the core game mechanic, the designers have created the ideal environment for the right type of interpersonal relationships between the players for a positive reinforcement of pro social behaviours to occur. This model gives us a new perspective on how games are played and subsequently opens the design space of video games to new possibilities. As Arsenault and Perron (2009) have noted before, the space of the game extends from the virtual system to the player and forms a reaction loop between them. Building upon this we can consider that in multiplayer games the game space extends to all the players simultaneously and, in consequence, includes the information loop created between them. Designs such as the one in Overcooked position the game between the players and this opens the possibility for designers to address the interactions between the players directly through the game itself. This new understanding of video games, not only as a back-and-forth between the players and the system but as a mediator between players, offers new possibilities worthy of exploration both in commercial and in serious games. More complex narrative elements would also be beneficial for games like these ones as they allow for a deeper involvement from the players and, if utilized correctly, it would allow for deeper connections between them. In the case of Overcooked, we can see that narrative elements are well implemented, but they are somewhat shallow in their execution. While they effectively shape the world of the game and help to bind all the mechanic elements cohesively, they provide almost no hermeneutic material that would otherwise allow the players to reflect and internalize the themes of the games from a narrative standpoint. As Belman and Flanagan

(2010) mention, deeper stories are a good tool to incite a desired emotional state in the players during which they would be more receptive to the desired stimulation.

Future application of this design paradigm is vast. The medical field, for instance, has seen an increased interest in eliciting empathy and other related prosocial behaviours in their students and practicing professionals over the last decade and the use of video games is beginning to be considered as a useful tool to achieve this. As we have seen through this research this idea is quite viable as video games hold great potential as educational tools. Yet, the games that have been made so far are, for the most part, solitary experiences and according to our findings they would greatly improve in their task if they were to adopt a multiplayer-based experience as the one found in Overcooked. There is still work left when it comes to developing games for empathy, but our findings constitute a solid base for future endeavours that wish to delve deeply.

7.0 Conclusion

This research has explored some concepts of video game design and the effect they have on the development of empathy in their players. Video games are posing themselves as one of the premiere entertainment mediums for people of all ages, now more than ever more people engage with video games as part of their daily lives. As such, it is the labour of the designer to continue to innovate and explore new ideas and possibilities in the design and use of video games. The effect of video games on children has long been the centre of the discussion and studies from psychological and educational perspectives, most of them regarding violence and behaviour. It has been demonstrated through several researches and studies that the initial assumption that video games have a generally negative effect on children is false and that they, in fact, have several positive effects. This is not exclusive to children either, as it has also been found that video games can be beneficial for younger and older adults. Other research has also demonstrated the educational potential of video games, as they constantly teach their players the skills required to play and succeed in the game. This potential is not limited to just ludic skills and they have been shown to be applicable to other types of knowledge, the academic instructions being of special interest. This thesis has discussed the role that gameplay mechanics have on the interactions between video game players and how these can be used advantageously to elicit empathy and other pro social behaviours, addressing the question:

- What should video games that aim at eliciting the development of empathy in their players do?

Through the review and analysis of selected research work on the fields of education, psychology and video game design, we have determined the necessary elements that video games require in order to elicit the positive development of empathy in their players, particularly in children of typical cognitive development. The study of empathy has

determined it to be a multidimensional process that occurs at both cognitive and affective levels simultaneously, requiring each of adequate development and stimulation at different ages throughout the lives of individuals. Around 8 years of age children reach a critical point in their development of empathy and other pro social behaviours where interventions are most effective to improve the development of empathy. We have determined that the use of properly designed video games during this particular moment of development would be highly effective and beneficial.

Games have the potential to teach and reinforce behaviours and skills through pedagogic processes similar to experience-based learning. The interactive loop formed between the player and the game provides an ideal system for learning, as the game provides the player with the knowledge they need and then reacts and evaluates the player's application of this knowledge. Video games in particular are capable of dynamically adjusting the complexity of the tasks presented to the player, further improving their mastery of the acquired skill in an increasing manner, allowing the player to go from simply remembering to creatively applying, analysing, and evaluating. These characteristics are normally used by designers to inform the users the intended way to play the game, guiding and helping them to better their skills until they are able to win. This principle has been harnessed and studied by psychologists and educators through the use of games for the development of Social and Emotional Learning; in particular, the structure of therapeutic board games follow many of the principles mentioned before with the expressed purpose of applying them to improve the pro social abilities of children. These kinds of games achieve their goal by integrating the interaction between their players as part of the mechanical aspect of the game, providing a connection between their gameplay actions and the social mechanisms they are immersed in. This connection allows for excellent skill transferability

which helps children to apply in their real life the pro social skills they acquire and develop in these games.

Building on what has been described so far, we have concluded that by designing video game mechanics that focus on promoting positive interactions between the players, it is possible to elicit the development of empathy and other related pro social behaviours in them. When these interactions are not only part of the game, but part of the core game mechanics available to the players, they will have significant and lasting effects on them, irregardless of the content or theme of the game. This principle is equally applicable to both commercial and serious games and provides a new perspective on the design of video game mechanics, focusing now on the kind of interactions they promote and not so much on the actions they require. The video game Overcooked is a clear example of a design that revolves around the interaction between the players as the main gameplay mechanic. Cooperation and communication are the main tools the players have to succeed in the game and, as a consequence, they will be reinforced and improved. Designs like these ones require minimal, but mindful adjustments to be highly effective at eliciting better development of empathy in their players, often needing little more than focusing their effort and ensuring no gameplay dissonance occurs. Hopefully, the contributions made by this work will prove beneficial to the fields of research and design of video games. We hope that future researchers take this document as a foundation for further exploration, and that designers consider the information and recommendations provided here to inform their decisions in furthering innovation in video game design.

After considering the reach and limits of this research, there is a vast amount of territory available for future research. The first step would be to take on the task verifying experimentally the theoretical conclusion reached throughout this research project; this would undoubtedly provide important empirical information that would further inform researchers,

designers, and educators alike. For this purpose, a rough outline for an experiment has been provided as an annex to this document. Experiments like these could see variations on the type of game, ages of the participants and other variables that can widen the scope of our future understanding. After the events of the Covid-19 pandemic we, as academic researchers, should start looking into virtual and online tools that can provide new avenues for conducting experiments at a distance and without the need of physical contact. Methods and tools like these are already being used for collecting data in the form of online polls and surveys. For the area of game studies, some sandbox platforms like Tabletopia and Tabletop Simulator (Berserk Games, 2015), as well as online gaming in general have a lot of potential to enable not only research at a distance, but even possibly international cooperation without the need for displacement.

The exploration and conclusions of this research could also serve as guiding principles or inspiration for researchers that wish to explore the effect gameplay interactions can have in human behaviour more deeply, and for designers that have a desire to approach the design of game mechanics from a new perspective, one that is perhaps more preoccupied by the social aspect of gaming and the relationships between players, rather than with dexterity and high skill ceilings.

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Annex

Proposed Methodology

The planning and design of the experiments are offered here both as a proof of work and as a possible blueprint for future research that wishes to test or improve the conclusions reached in this document.

This experiment was designed with the hopes of finding a change in the empathy levels of the participants after a gaming session. Following the theory that has been developed, we should see an increase in the empathy levels of the participants after being exposed to game mechanics that require positive player interactions through their prosocial behaviours, such as teamwork, communication, etc.

Procedure

The study will consist of an empathy test and a gaming session, and will be divided into two parts. The first part will be comprised of an intake test to establish the baseline empathy levels of the participants. The second part will include a group gaming session of a duration of 20 minutes, in which the participants will play a cooperative game, and a second application of the empathy test after the gaming session.

Participants

The participants will be children between the ages of 9 and 11 years old with a typical cognitive development, and no distinction between sexes will be made. The type of data that will be collected is of qualitative character with a mixed approach as the final results are expressed in computable numbers.

Instruments

The instrument that will be used is the Kids Empathic Development Scale test (Reid et al., 2012) which presents a series of scenarios and questions that are asked to the participants. Their responses are then evaluated by the researcher and assigned a numerical value following the test guidelines. The values are then added to obtain an overall score. The video game that will be used is Overcooked (Ghost Town Games, 2016), a casual cooperative multiplayer game where the players must work as a team to cook and deliver as many orders as possible.