This Emotion of Mine: a diary study on affective learning in videogaming environments.

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Abstract: Videogames are a medium that is growing in popularity, disregarding age, sex and socio-economic barriers. This study, utilizing a combination of methodologies, aimed at investigating the occurrence of affective learning instances in videogame environments. Affective learning is considered to be the process by which learning instances are enhanced by the emotions that the learner experiences. The methodologies that formed the research effort were a longitudinal diary study, investigating how participants play in numerous instances, and a follow-up interview, in order to understand more comprehensively the processes that the participants underwent during the longitudinal study. The findings stemming from the data explain what links exist amongst game elements and affective-learning processes. Affective learning outcomes stemming from the data were empathy, willingness to help and perspective change: these outcomes were found in the participants in different degrees. Viewing the effects of Game Elements such as Mechanics, Context, Narrative and Ethics on participants led to the determination of their relevance relating to affective learning instances. The game utilised for this research effort, This War of Mine, was chosen due to it's bridging characteristic: bridging two categorisations of the videogame medium, serious videogames and commercial videogames, This War of Mine is considered to be an innovative game that can shed light on both categorisations, in a holistic manner. The limitations of this study were underlined and conclusions to regarding the effects of Game Elements on affective learning experiences are drawn.

Keywords: videogames, learning, affective learning, this war of mine, diary study.

1. Introduction

In recent years, numerous studies have explained the effects of videogame play: researchers have focused their attention on specific categorisations of videogames, such as Michael & Chen (2006), who directed their attention categorically towards serious games; De La Hera (2017) subsequently evolved the line of thought that investigated the impact of persuasive effects of serious games, establishing different types of persuasion that occur in serious videogames.

Game designers have the tools, the knowledge and the means to write, and therefore design, guidelines for player experience: the resulting interaction, between game designers and videogame players, is one of the numerous environments in which learning processes can take place (Robison, 2004). Game designers can embed game elements in such a way that they can influence learning occurrences both for the games' purposes and for real world interaction purposes: they can teach players how to navigate their digital surroundings, or demonstrate real-life interactions, from which players may develop certain attitudes. Scholars, on the other hand, can benefit from this type of study, since this research aims to add concrete insights to the gap found in the field of videogame studies. This gap is represented by a lack of field research of learning experiences that come from the player-game interaction, whilst theoretical work has been multifaceted and extensive (Squire, 2008).

In order to discover if and how learning outcomes can be encountered through players' experience, the IMP (Integrated Model of Player experience) model, theorised by Elson, Breuer, Ivory & Quandt (2014b), has to be introduced: the IMP model considers three relevant factors that take place in videogaming processes, and that enhance the playing experience itself: Context, Mechanics and Narrative. Narrative in the videogame medium can be understood as a heterogeneous field, that encompasses all the elements that entail information regarding the storyline of the game. This can range from the plot around which the game is built upon, to micro-narratives that develop around certain characters, reaching even the narrative that the players build themselves around the game, giving personality and enriching their personal game experience. Mechanics are the means through which players interact with the digital environment, incorporating the rules and constraints that may exist within the game's system. Through mechanics players have a way of expressing themselves within the limits of the digital environment in which they take part, and are able to inhabit the digital environment with its set of rules and regulations. The innate interactivity (Garite, 2003) that differentiates videogames from other traditional media is built upon mechanics that enable players to act within the digital world, to follow its rules and they allow reflective instances to occur, which subsequently fall into learning instances, and lastly, affective learning instances. Lastly, Context involves both the game contextualisation aspects, considering players' *direct* interaction in multiplayer games and *indirect* interaction through social media or on-line guides, and the social, political and cultural context in which the game is played. The context of a digital environment includes both in-game and real-world interactions, making this element more complex and troublesome to define than the previously mentioned ones. The variety of videogames available on the market, the socio-cultural-economic context in which the players find themselves in, in which the developers create videogames, in which the videogame community is built on and around, in an ever-growing global community, all construct contextual meaning.

In addition, in order to complete IMP's established factors, a supplementary element was considered, namely the Ethics & Morality element, since videogames are not passive entities morality and ethicality, just like any other medium. Ethics and Morals were added due to the relevance that they encompass in learning instances. Posing players in front of ethical or moral dilemmas, forces them to make a choice. Emotions can dictate the decision-

making process, as they can influence the reaction to the outcome of the decision. Ethical decisions and the outcomes that derive from them, can make the player internalise the processes and subsequently make them revise their own morals: this would be an outcome of affective learning processes. All these elements comprise the basic elements of gaming experience, and learning processes that can occur consequently, and will be detailed with more depth in the following chapter. These associations can predominantly favour mechanics over narrative, or focus on narrative over context, whilst still considering player's enjoyment and motivation (Kallio, Mäyrä & Kaipainen, 2011).

All of these factors, however combined to create a videogame, are conveyors of meaning, therefore they can be understood as emotionally imbued primers, as they interact with the player. Since one of the main features of videogame play that differentiates the consumption of the medium from other media, is the intrinsic interactivity of videogames (Garite, 2003), it is of extreme relevance to investigate to what degree they are involved in learning experiences, intended as instances where learning occurs during the player-videogame interaction. Learning experiences, occurring either analogically or digitally, space throughout extended periods of time, hence the reason to investigate affective learning instances throughout a determined period of time, utilizing a horizontally focused method, namely a longitudinal diary study, which will be explained thoroughly in the method section: videogame players, usually, tend to engage in playing activities over a period of time (depending on the length of a game, or its enjoyment), and this was the reasoning behind the choice of a diary study over more established methods, since it offers a more accurate portrayal of previously mentioned extended engagements.

Learning instances in videogame environments, concerning the affective domain, focus on learners perceptions, emotions and degrees of acceptance or rejection of the digital content consumed (Belanger & Jordan, 2000). The objectives of these affective learning instances contain feelings, motivations, attitudes and values (Kratwohl, Bloom & Masia, 1964).

Directing research efforts towards what Elson et al. (2014b) affirm as a relevant factor, namely Game Experience, defined as the comprehensive sum of Context, Mechanics and Narrative, plus the addition of Ethics and Morality, and their impact on learning processes, is of great interest for both scholars and videogame designers, and with the utilization of the videogame This War of Mine (11Bit Studios, 2014) the question this research will be based upon is: *How are learning outcomes, experienced through videogame playing experiences, impacted by emotional driven primers stimulated by Mechanics, Context, Narrative and Ethics?*

2. Theoretical Framework

The scope of this research stands in analysing how features of videogames defined in previous studies, grouped in Mechanics, Narrative and Context, with the addition of the Ethics and Morality dimensions, have lasting effects on affective learning processes, intrinsic to their nature. These overarching elements relate to choices made by game designers and jointly with the situation in which the game is played, contribute to the players' experience (Elson et al., 2014b). As Shaffer, Squire, Halverson & Gee (2005) affirm in their research on the new learning possibilities created by the advent of digital environments, that videogames create new cultural and social dimensions in which players find themselves navigating. Through this exploration, players learn various skillsets that can be translated to the real world they inhabit. Transfer of learning is not the primary focus of commercialized videogames, whereas serious videogames do have it as an intended outcome (Woods, 2004):

therefore, game designers have the difficult task to design a desirable product, yet convey a message, be it purely hedonistic or completed with the intent of a eudaimonic experience.

Eudaimonic gratifications (Oliver & Raney, 2011) in videogames are linked to purposeful entertainment experiences, commonly viewed as the acknowledgment of the learning processes embedded in gameplay, while hedonic gratifications are the result of funny and pleasurable videogame experiences. The differentiation of the two concepts, hedonia and eudaimonia (Huta & Waterman, 2013), can be explained as follows: hedonia comprises subjective, short-lasting emotional states, such as pleasure, comfort and relaxation, on the other hand eudaimonia is represented by more complex, long-lasting thoughtful processes and cognitive evaluations. Nevertheless, hedonia is the emblem of digital experiences (Huta & Waterman, 2013), with its pleasure-immediacy, but the eudaimonic pleasure draws players to reiterate the videogaming experiences (Oliver & Raney, 2011).

Furthering this conceptualization, the recognition of learning elements by the players falls under the umbrella of the meta-cognitive sciences. Meta-learning concerns the ability of an individual to understand the learning process they are taking part of. Meta-learning as an active process that involves recognising the intention of the learning experience. Analysing the possible outcomes of the meta-learning experience, develops a new socio-cultural dimension that allows players to detect, evaluate and contextualise information, shifting the learning paradigm from traditional education based on repeating and recalling information, to a more active process of learning through trial-and-error where the learner tries to tackle problems in a multitude of different approaches. Experiencing both positive and negative outcomes and pertaining information of meta-learning outcomes, is a way of possibly relating them to real-life occurrences of similar predicaments. Digital environments establish the perfect setting for trial-and-error type of learning, where failing is not portrayed negatively, but positively as a way of testing different possibilities, without any real-world consequence: impacts on the digital environment are a testing field for the impacts on the real world, and players are invited to actively recognize their own actions and reflect on them.
Such meta-cognition has demonstrated to be an enhancer in learning processes, because the self-awareness that, in this case, the players exhibit, allows them to be more reflective and intentional in learning and also to determine more effective learning patterns (Chick, Karis & Kernahan, 2009).

A brief explanation of the following topics discussed in the theoretical framework is in order. Firstly, an overlook of the videogame on which this research is based upon This War of Mine is given. Subsequently affective learning as a concept is detailed, and its relevance within the videogame environments. Lastly, the four features of videogames Mechanics, Narrative, Context and Ethics are elucidated, linking the theoretical implications of the Game Experience features, to the digital environment of This War of Mine.

2.1 - This War of Mine Explained

This War of Mine (11Bit Studios, 2014) approaching a sensitive topic such as war, from a civilian perspective (Toma, 2015), is in contrast to more commercial digital games that glorify *super-soldiers* that can defeat entire battalions single-handedly. The choice of following the players interaction with this particular game, is well-thought of: through the game experience that the game provides, players are eased into reflecting on their own actions, via feedback presented to the player as in-game character reflections. This process of self-reflection serves as a starting point into embodying affect-driven learning outcomes, which is the goal of the present research effort. Furthermore, as Kors, Van der Spek & Schouten (2015) illustrated, videogames not only allow players to empathize with the characters they engage in playing activities with, but also it offers arguments of reflection

about people, events or situations, represented in such digital environments: hence studying these empathy-driven occurrences is of great interest for game designers and scholars alike.

This War of Mine is an unusual take on war games: narrative elements allow the player to embody a group of civilians, fighting and struggling to survive, in a fictional city, namely Pogoren, that is being torn apart by an armed conflict. This War of Mine is a 2D side-scrolling survival game, where a group of survivors controlled by the player has to endure until the fictional, yet credible, ending of the war. In order to fulfil the various needs of the group members (e.g. eating, sleeping, healing or heating), the player has to go out of the shelter, scavenging various locations in Pogoren: these locations may have NPCs (Non-Playable Characters) within their confinements. These encounters may be valuable both on a narrative level and on an instrumental level, such as meeting traders, or may be thought provoking and morally compelling, such as crossing paths with elderly or people in poor conditions, or they may even be threatening, such as engaging other aggressive scavengers or soldiers. The various locations depicted on the map of Pogoren, where every night the player can select a location in which the character chosen to go scavenge, represents the scavenging-process element of the game, and the main income of resources that the player can acquire.

The first mechanic touched upon is the day-night cycle and how it allows games to progress. During the day the player has to build crafting stations, traps for raw food, to later cook: it entangles the player with a base management system, that starts with nothing but a fridge and a workshop station. During night-time, however, the player faces the first meaningful choice: to scavenge for resources in nearby locations, pinned on a map, or to defend the refuge and the resources accumulated that far. Furthermore, there is a third option that is sleeping, which rests the character for the day that follows, although having the possibility of raiders coming and taking the undefended resources. The players will find early in their playthrough, that resources are scarce, and locations have an informative panel which represents the type of resources the player will find, although not in a detailed manner, just if there are "*A lot*/ *Scarcity*" of the possible resources.

The second mechanic of the game is the presence of what is defined winter-summer cycle, where the two seasons follow each other cyclically: this brings an added layer of difficulty to the already strenuous task of surviving, due to an increase in resource usage, in order to maintain the shelter in which the players live habitable.

The game designers stressed upon what they called *emotional realism* (de Smale, Kors & Sandovar, 2017): in order to create a compelling, yet emotionally realistic, portrayal of war specifically from a civilian standpoint, circumstances they may endure, such as unwellness, misery and boredom are included as mechanics of the game. A vital component to convey such emotional realism, is to make the player feel that no place is safe: locations in the city that they have to visit, are not always welcoming, and even the shelter, or safehouse, can be raided during the night. This results in a feeling of uncertainty instilled in the player, that has to guard, or upgrade with safety rudimental safety measure such as boarding up the windows in order to better defend the characters and their possessions.

With different resources they need to acquire during gameplay, the players have to tend to the overpowering needs of the characters: physical wounds with antiseptics, herbal remedies in order to cure sickness and books to face boredom. There are different stages to these needs: a character may not eat for a full day-night cycle, becoming therefore *Hungry*, that is not an encumbering state, but makes the player aware that food must have some priority over other resources. If the character does not eat again, *Hungry* becomes *Starving*, and ultimately, it may lead to the character's death. This mechanic is situated in a way that makes the player take decisions on the next course of action, whilst reflecting on the possible future actions: no character might have a *Hungry* state, but seeing that the food reserves are nearing an end, the player may start prioritizing going to locations with more opportunities to

find food. Since there is not a restriction on the amount of states a character can have at any given time, meaning a character may be tired, hungry and wounded, emotionally driven decisions have to take place in response to the various needs.

There is also a psychological well-being factor that players have to consider: the characters have a *Bio* card (Biography card) that acts a feedback board for narrative and mechanical elements, which is filled with the most relevant events that the characters incur. Well-being, or happiness, increases if good actions are performed, and decreases, if bad ones occur. But it is not all black and white: some characters might not like giving meals to people who need them (being that it is taken from the hard-earned scavenging runs), which is seen as a positive interaction with NPCs, and the same can be said for negative interactions (such as fighting NPCs or stealing from NPCs) which can be taken as "necessary evil".

These ethical and moral dilemmas are the strong point of this digital game, and lead to the assumption that players are able to reflect, even if briefly, on the interactions, and actions, they want to make. 11Bit Studios tailored the game to be an emotionally realistic depiction of war, from a civilian perspective: this was not to create a "simulation" game, but to create a humanized experience of war (de Smale et al., 2017), often lost in other games. Some of the techniques utilized to convey such emotional realism, like not having multiple save files during the same game (meaning there is no backtracking or rethinking a strategy, at least for that specific game) and the *permadeath* (permanent death, characters are unable to come back to life after dying) element, were employed, thus creating an emotional experience. Furthermore, the design aspect of boredom was implemented in the game, considering the fact that war is not a perpetual sequence of traumatic events (de Smale et al., 2017).

The game ends with the *ceasefire* being issued, stopping all conflicts in the city of Pogoren: this will start the ending sequence where the player will relive their choices, with instant-photos, with a brief detail of how in-game characters reacted to said decisions. This epilogue brings closure to the survival of the characters, giving a brief explanation of how the lives of the survivors changed, after returning to a normal life. The game is tailored in a way that the player does not have a clean way out of the game, as it is impossible to complete the game without taking actions that either are morally relevant or difficult, thus players might feel overwhelmed by the amount of tough choices they have to make.

It should be clear by now that the game proposed makes the player explicitly reflect on their own actions, giving the opportunity to choose, but with tough choices that do not have a perfect outcome to the problems they face: scavenging for resources can prove beneficial for the player, but at the cost of disrupting other characters' life: the moral dilemmas that the players have to face, and the ethicality of these choices are affected by game elements, as well as players' ethical compass. Via the demonstration that for every action there is a reaction, the player will not only learn through gameplay, but this course of action will also have long lasting effects on information retention (Ricci, 1994). The impact of the game elements on ethos, described as persuasion via empathy and integrity (Evans, 2011), is one of the proposed outcomes of this study. Moreover, empathy, willingness to help and cooperation sentiments are outcomes that are expected to be the result of the interaction between the participants and the videogame environment. Considering long-lasting effects, perspective taking actions taken by the players would translate to a change in said perspective, reflecting therefore the internalisation of resolution techniques acquired during gameplay.

Although this study is a investigates a short period of time, affective-learning instances in their prime are occurrences that cannot be overlooked. Outcomes such as empathy, willingness to help and cooperation sentiments are a result of the players' personal development, yet the presence of self-reflection is a process that is an indication of affective learning priming functioning as expected.

2.2 - Affective Learning

Benjamin, Bloom & Krathwohl (1956) described in their research affective learning objectives as those which emphasize a feeling tone, an emotion or a degree of acceptance and this conceptualization was furtherly developed by Ellis & Fouts (1996), which defined the affective domain as the area of education which concentrates on attitudinal and emotional development.

Affective learning represents the internalization of positive or negative attitudes emerged during the videogame experience (Russo & Benson, 2005), and the learning outcomes arisen from affective learning strategies that are impacted positively or negatively, from the attitude internalisation process (Vermunt, 1996). Affective learning demands the integration of cognitive, emotional & aesthetic dimensions, which all are of interest in learning processes (Girod, Rau & Schepige, 2003). Emotions play a vital component in decision making, action and planning (Dormann & Biddle, 2008), and Dirkx (2001) suggested that the role of emotion while learning is not solely of motivational consideration, elaborating that the affective dimension provides the foundation for practical, conceptual and imaginative learning modalities to occur. Learning processes in digital games have attracted a number of researchers to delve deeper into their functionalities: these processes have been examined in explicitly educational games, such as *Storium* and *MetaBlast*, but also in less edu-gaming settings, such as *Civilization* or *Crusader Kings* (Mozelius, Fagerström & Söderquist, 2017).

Affective learning, the learning process activated through emotions, needs to firstly be experienced by the players and subsequently interpreted the players' emotions and, consequentially, an emotional priming experience needs to be tailored in order to motivate players into deeper learning (Dormann & Biddle, 2008). This process is detailed as the *affective loop* (Sundstrom, 2005), which is described as an emotion-driven cyclical interaction, where emotions are the focal point in the development of the player, not only regarding the virtual world, but also the real world the player inhabits. The affective loop is an interaction of processes, where the players express their emotions through the manipulation of the digital environment. The game then responds consequentially to the emotion expression with designed affective expressions which ultimately lead to affective learning processes to occur.

Researchers have utilized concepts such as *meta-emotions* to describe the process by which players can determine and evaluate personal emotional responses (Bartsch et al., 2008): this would lead to the assumption that affective learning outcomes can develop on a direct level where the experience is straightforward and automatic, and reflectively where cognition encompasses impressions and awareness about an emotional state (Hofer & Wirth, 2012). In the following chapters, elucidations on how Game Experience elements, namely Narrative, Mechanics and Context, with the addition of Ethics, prime affective learning occurrences and how they are found in the game This War of Mine.

2.3 - Game Mechanics

Bogost (2007), with his conceptualisation of *procedural rhetoric* argues that axioms of how the real-world works are translated into virtual dimensions: players can learn of real-world processes from experiencing them in virtual dimensions, such as videogames. Procedural rhetoric encompasses persuasion as a process to transmit ideas compellingly and ultimately lead to action, such as perspective change. Videogames, contrarily to previous media, do not persuade via material occurrences, but with processes, with the aid articulated

symbolism that is able to reflect even more conceptual and abstract systems. Although Bogost's view does not encompass how people learn, it lays the foundation for how designers can encompass learning processes, comprehensive of affective learning processes, in virtual environments. Further contributing to Bogost's concepts, Shultz Colby (2017) illustrated how videogames can be beneficial to learning processes, due to their innate interactivity establishing an interrelationship between players' personal improvements, cognitively and affectively, and the rule-based system, enunciated by Bogost.

A contrasting view presented by Frasca (2013), conceptualizing *simulation rhetoric*, sees videogame designers as law-crafters, which convey ideologies by adding, or leaving out, manipulation rules. The big difference between Bogost's view and Frasca's view, is that the first compares procedural rhetoric with theories of written, verbal and visual rhetoric, whilst the latter analyses simulation rhetoric confronting it with narrative and drama, as storytelling processes: one view distinguishes virtual environments from its counterparts, and the other compares narrative elements of all the media, and their structure.

Unlike traditional media, such as literature, radio or television, videogames are defined not only by their narrative, but also with the mechanics with which the players interact with the game narrative. Mechanics incorporate the *rules*, and define the possibilities that the player can encounter with their interaction (Elson et al., 2014b). One mechanic is understood as the manipulation of one possible interaction that takes place in the gaming process, both at a general level and at a more in-depth specific level. A single game can incorporate many distinct mechanics, and a single mechanic can be a part of many distinct games (Lundgren & Bjork, 2003): many games incorporate a jumping mechanic, but it is one of the ensemble of mechanics embedded in any given game.

But not all mechanics are the same: some mechanics can be understood as essential to the game, whilst others can be used only in pre-determined moments, or only to solve specific issues, within the digital environment. The essential mechanics, or *core* mechanics (Jarvinen, 2008; Sicart, 2008), solve challenges posed to the player, which completion leads to the desired end-state. An example of a core mechanic can be parkouring, in Mirror's Edge (Electronic Arts DICE, 2008). Mirror's Edge is a first-person action free-running videogame, where the player navigates the world through Faith, the main character. Jumping from rooftop to rooftop is the core mechanic because otherwise it would be impossible to navigate the digital environment in which the player finds himself in. These mechanics are usually introduced to the player at the early stages of the game, and may also be revised, or enhanced, during the game-timespan: jumping can become double-jumping or wall-jumping, walking can become running. On the other hand, *secondary* mechanics, are those that are either available infrequently, or that necessitate the simultaneous use of a core mechanic, in order to solve challenges that the player might face: an example could be the pathfinding system in Mirror's Edge, which highlights environmental cues, such as pipelines or doors, with a colour that stands out from the rest of the digital environment. This is a perfect example of how a mechanics can used in combination to achieve the game-postulated goal: knowledge of the navigation for completing the level is not enough to complete it, but it requires the core jumping mechanic in order to execute said level.

Mechanics, intended as creatively expressed engineering & design processes, are what distinguish videogames from other media: they are the means by which players can interact with the desired game features, by interacting with each other (Nelson & Mateas, 2009). Hunicke et al. (2004) conceptualized a hierarchical structure that places mechanics, as intended previously, at its base: hence in Hunicke's model, *mechanics* construe the rules of the game, obeyed by the players and the game alike.

Building on these pre-existing conceptualizations of videogame mechanics, Sicart (2008) defined game mechanics as methods invoked by agents, designed for interaction with

the game state. This perception of approach, distinguishes and differentiates, mechanics and rules: mechanics concern the actual interaction of the player with the digital environment in which he is portrayed in, whilst rules provide the environment where the interaction is possible (Sicart, 2008).

Ultimately, mechanics relate closely to affective learning and meta-cognition, because allow reflective instances to occur: via acting through mechanics, players receive feedback that comes from their actions, when engaging in the digital environment. Mechanics innately allow meta-cognitive instances to occur, as players are aware and follow mechanics in the digital environment, therefore leading to the first level of reflection within the game's system.

Thereafter there is a second level of reflection, where players receive and respond to the feedback given, further deepening the learning processes that occur, possibly via emotionally imbued information. As feedback is a fundamental factor in affective learning (Robison, McQuiggan & Lester, 2009), it is extremely important that the players receive feedback on their actions, allowing them, if needed, to revise their personal knowledge and learn when knowledge is missing or mistaken. Players have to cognitively create a mental model of the mechanics that the game entails (Wouters, Van Der Spek & Van Oostendorp, 2009), and if discrepancies occur, learning can occur: if these discrepancies pertain to the affective domain, affective learning instances occur instead.

This War of Mine is distinctive as a videogame, since it does not illustrate how or when to navigate the digital environment it portrays, leaving the player to experiment and explore, between the environmental rules, the multiplicity of opportunities. Players interact with the characters via ordering them to perform a set of duties, such as cooking, sleeping or clearing out rubble: certain characters might perform tasks in a more time-efficient manner, but this is not clearly displayed to the player. A good cook is skilled in cooking, but more abstract information regarding the background of the characters, such as athlete, do not directly inform on how quicker the character is: the player has to test and experiment. Other rules set by the game designers, such as time, seasons or crime outbreaks, affect indirectly the players, that do not have any way of controlling such events, but have the means to mitigate the negative effects of such occurrences.

In relation to affective learning, mechanics lay the ground for emotionally imbued events to occur, whilst also providing the means to interact with the environment to the player. Mechanics themselves are not designed to provoke emotionally driven responses, but are fundamental for affective occurrences to take place, allowing other Game Experience (Narrative & Context) to take place and affectively prime learning experiences.

Game Mechanics can be seen as the tools given to the players in order to navigate the virtual environment created by the designers: this virtual environment not only comprises the virtual setting in which the player has to operate, but can also encompass narrative elements that define the story in which the game is set.

2.4 - Game Narrative

Similarly to narrative aspects found in literature and in movies, narrative in videogame environments shapes and encompasses games' story, setting, plot, characters (and their attributes), events and dialogues (Bizzocchi & Tanenbaum, 2012). Narrative aspects of videogame environments, however, pose a significant design challenge: being such a heterogeneous field, narrative storylines can be conceptualized by designers (e.g. *The Witcher 3: Wild Hunt*, 2015), crafted by the players (e.g. *The Sims 4*, 2014), or comprise a mixture of both (e.g. User-generated content in *The Elder Scrolls: Skyrim*, 2011). In the first example, *The Witcher 3: Wild Hunt* (CD Project Red, 2015), players experience the narration as the designers wrote it, without the possibility to tailor a player-made narration. In the second

example, *The Sims 4* (Eidos, 2014), the players create their own narrative, as the designer only give the tools and the environment in which the story will take place. In the last example, *The Elder Scroll V: Skyrim* (Bethesda, 2011), a mix of both previous narrative styles is possible: the designers tailored a narration to be experienced by the players and gave the tools in order to implement player-generated content.

Being the scope of this study is the videogame This War of Mine (11bit Studios, 2014), the narrative aspect will focus on the semi-linear approach, since it is the narrative style used by the game designers: the events occurring during gameplay are dictated by the player, that chooses the preferred path. Narrative aspects are freely discovered by the player, who navigates the fictitious city of Pogoren at will, with each location entailing a specific narrative event: a player might not encounter a set narrative event, and even if the encounter occurs, how it unfolds is decided by the player's actions and the personal and ethical dynamics that follow a decision. An example could be found in stumbling upon an elderly couple in a house: the player finds himself in a position to steal from them, to kill them or to just leave the location without any resources. All of these paths have different repercussions on the experience, the player and the character that is controlled by the player. Based on Bizzocchi's work (2007), narrative elements have been categorized in five different variables: namely Narrative Arc, Storyworld, Character, Emotion and Narrativized Interface.

Narrative Arc is understood as the logical sequencing of events in a determined time and space (Ryan, 2006): it is the main plot which unfolds chronologically as the player progresses through the story. A feature recurring in videogames is the presence of *side-quests*: objectives that don't necessarily evolve the main plot, or narrative, and in most games, are not required to be completed, to finish the story. These are accepted as micro-narratives, miniature narrative sections, that are self-progressive and self-coherent (Jenkins, 2004), which enhance players' immersion, contextualising the digital world created by game designers. This War of Mine evolves its narrative on players' choices, making every input meaningful for the progression of the story. Furthermore, every new instance of the game leads to different outcomes, meaning there is no exact same start: nevertheless, encounters have a fixed location, but it is up to the player to experience them, leaving the freedom to pursue a different path, if wanted or needed.

The Storyworld is the *space of possibilities* (Salen & Zimmermann, 2004) navigable by the player: it's the container of all of the narrative and micro-narrative aspects, and it shapes, and is shaped, by players' actions. The storyworld in This War of Mine relates to the setting in which the narrative is set, the shelter which the player has to manage during the day and the various locations they can go and scavenge during the night. Moreover, concerning micro-narrative aspects, the psychological effects endured by the characters, which provide feedback on the player's decisions throughout the gameplay, can be considered as narrative elements, contributing to the immersion of the player and the emotional context in which the game is imbued.

The Character, as the name says, represents the design, both visual and psychological, of the main narration identifier. The more the player can shape the game character, or avatar, and make compelling choices that affect said character, the more the player establishes a deeper relationship with it, which translates to a motivational state (Gee, 2003). More detailed and complex, spatial and social environments in which the player can perform actions, and more authentic interactions with the player/ character that elicit perspective taking processes, make the identification process more complete and more effective (Parise, Kiesler, Sproull & Waters, 1999). Identification can be detailed as the alteration of self-perception during videogame play (Hefner, Klimmt & Vorderer, 2007), meaning that the players adopt significant attributes of the characters that are interacted with. The characters have compelling backstories, designed to make the player feel empathy towards them, and

having different backgrounds, as well as different roles (such as ex-cook or ex-teacher) they all have a different degree of impact on the player. Although having an instrumental value to the game, such as a more valuable skillset, they still maintain a certain degree of emotional value attached to them: being able to cook is a skillset that is still relevant in a war scenario, such as the game depicts, being a photographer or a journalist, does not have the same degree of importance, in such a scenario.

Emotion is closely connected, as a result, to character design, supporting narrative via character's visual and psychological design, as stated previously, storyworld design, dialogue and plot (narration arc) development (Freeman, 2004). Furthermore, as Livingstone & Brown (2005) stated, game music, or soundtrack, plays a strong role in the player's emotional responses and can impact immersion and time-perception (Sanders & Cairns, 2010). As previously stated, emotional value is retrievable in multiple instances, throughout the gaming experience of TWoM: the somber music exacerbates the feeling of brevity of life and acceptance of what is happening in Pogoren. The soundtrack makes the player feel even more immersed in this daunting scenario, yet music is not the only emotional drive present in the game design. The topic of war itself, the grittiness of the visuals, the dark colour palette, as well as the randomized period the players have to wait until the "ceasefire", the game ending, also are vectors of a strong sense of uncertainty, that this study avoids with its settings.

The final element, Narrativized interface, is the design strategy that directly supports the relationship between interactive decision-making, and enjoyment of the narrative arc (Bizzocchi, Lin & Tanenbaum 2011). The narrativized interface in TWoM is subtle: the inventory system, where the resources are stashed and retrievable from the player, has a very specific name, *Our Things*, and the shelter that fosters the characters during gameplay is called *Our Shelter*. Furthermore, the health of the characters is not portrayed in numerical values, as is ordinary to see, but in terms of affect: *sad*, *depressed* for mental health, and *lightly wounded*, *severely wounded* for physical health.

Comprehensively, these elements had the intent of humanizing the experience of war (de Smale et al., 2017), distancing from what Sicart (2009) described as strategic instrumental play, where players would just be encouraged to aspire to the best possible outcome each time, with the possibility of not facing the consequences of their actions, via saving/reloading mechanisms.

Narrative elements define and tailor the virtual environment which the player will be able to traverse: the narration will proceed as the player will see fit, conjointly with the mechanics embedded in the game, that will need to be contextualized for the player, in its various facets.

In order to link the narrative context to the affective learning dimension, it has to be clear that players, and more broadly human beings, give meaning to events occurring in their lives associating them with pre-existing knowledge: ultimately, this underlines the fact that players react to narrativized content differently, based on previous experiences, hence having different relevance for differing people. The narrative elements elicit, or try to elicit, a certain emotion, as intended by the writer, but players ascribe different meaning from the narrative elements, based on their personal experience, both in the virtual world and in the real-world. As two people will talk about a movie remembering different details, two players will experience the same narrative in a game differently.

2.5 - Game Context

The last game element considered by Elson, game context, relates to the influence of social digital play contextualization. This social context not only considers the device the game is played on, but furthermore it includes the location in which the game is played and

the possible interaction in situ of the players (Elson et al., 2014b). Said interaction amongst players, clearly is less present in *single-player digital games*, contrasting the effect in *multiplayer digital games*: in single-player games, interaction with others might be via online guides, Reddit or forums with other players or it might be playing with someone in the same room. Multiplayer videogames can host a multiplicity of interactions amongst players: multiplayer settings have demonstrated their benefits, such as memory enhancement (Blumen & Rajan, 2009) or better overall affective emotions (Cline & Kellaris, 2007). Furthermore, research efforts have shown that positive emotions, whilst playing with someone, have a better impact on their feeling perception, in contrast to negative emotions (Dardis & Schmierbach, 2012).

Game context has been neglected by scholars, as it is the game element that has been least researched upon, and also being the least defined of the game elements (Gentile, 2011). It is of relevance to include social, cultural and political context as part of this game element, as they represent a factor of extreme importance when considering how, with what mindset and in which modes a game is played, as it conveys distinct meanings, as these elements differ: social context can be distinguished as playing with other people randomly, playing with a group of friends or playing solo: these elements may impact the social dynamics found in the game therefore having an effect on affective learning processes. Cultural heritage has an impact not only on how games are viewed by the general population, but also on how players act in virtual environments: even more so, it determines how game designers tailor certain elements of gameplay, as it can encompass a great degree of nuances that inevitably determine if certain elements will be implemented, revised, or cut from the design process. Political context, as the cultural one, influences both the player and the designers, which can, more or less knowingly, implement political agendas in their virtual environments.

All of these facets are fall into the bigger concept of game context, and can be seen as independent variables that interact with each other, and the player, during game experiences: two different players may be experiencing the same game, but contextual factors might make the two distinct instances very different from one another.

Topics that revolve around political, cultural and social contexts, have to be recognised by game designers, and players, that also have to understand the weight these conceptualizations have, both ethically and morally. Context is a fundamental element of This War of Mine, as its conceptualisation was in order to make people view war from a civilian's standpoint, something unique to this game. This War of Mine contextually puts the players in a situation they have to get out of, with little to no initial background. The background becomes clearer and clearer as the players progress towards the ceasefire, the end of the game, meaning that players discover and learn about their characters' past through the different interactions they partake in. The game was released in 2014, a year of uncertainty and fear of global conflict, especially regarding the Middle East: as the game was developed in Poland, from a multicultural team of game developers and programmers, it wanted to shed light on how war is, and the fact that it is not such a far-away problem. This War of Mine is a window on what most people haven't experienced in the Western world, and as such it clashes with personal contexts of the players, that have to react individually to the gap found between these two very different contexts, especially emotionally due to the complexity of the socio-cultural-economic contextualization of the game.

2.6 - Game ethics & morality

Before delving into the two concepts of game ethics, and game morality, one must first understand what these two concepts represent. Sicart (2009) defined these separate two concepts in an extensive way: morals are asserted as a boolean dichotomy of right or wrong,

of objects/people or actions, whilst ethics are the set of moral values and the tools for their analysis. Ethics are a result of decision-making processes that take place in the determination of right or wrong, meaning that external factor are taken into account, evaluating interests or values. Morals, on the other hand, refer to a personal and identifying code of behaviour Players, due to the innate interactivity of the videogaming medium, are not passive entities of morality, such as in other media: they enforce decision-making processes, reflecting on their virtualized actions, relating them to real-world interactions they have encountered and, ultimately, shape their ethical mind with video games, in this described context.

As game developers bound player's ethical agency to their products, narratives have grown increasingly in immersion, giving meaning to the choices that players make, through previously detailed narrative elements. Worthy of consideration, though, is the commonly overlooked factor, that ethical decision-making aspects are usually portrayed by game developers, and are explicitly shown as the previously mentioned dichotomy of good choice versus bad choice: a great example, but far from the first game to depict mechanics, is the Mass Effect Trilogy (Bioware, 2007; 2010; 2012), with the Paragon-Renegade mechanic. This mechanic through which the action role-playing third-person shooter game evolves narratively is the possibility to choose amongst two main paths: Paragon reflects the good, or charming, path, whilst Renegade embodies the evil, or intimidatory, course of action.

Mass Effect poses as great example for morality, choice and representation of ethical decision-making processes: the fact that the developers decided to graphically represent Paragon as the blue choice, and Renegade as red, gives a player experiencing the game for the first time, an explicit indication of what choice is the good one, and which one the bad one. Furthermore, the choices vary the outcome of the game dramatically: if a player decides to sacrifice a companion instead of another one, the narrative of following events changes. The choices the player makes, not only have an effect on the narrative, but also on the character embodied by the player: if the choices are consistently Paragon, the avatar will have a more "angelic" portrayal, with blue tonalities taking over, and smoother skin; if, instead, the choices are consistently Renegade, the avatar will show vivid red scars, and an overall "devilish" look is given to the avatar. This choice made by the developers, has an impact on how players receive feedback on their moral choices: having direct visual cues in response to the actions taken, leaves less space for personal sense-making, being that the player doesn't have to reflect extensively on the morality behind each choice, having already a Paragon/Renegade connotation the choice itself.

Very different is the case of the game chosen for this research, This War of Mine. The game designers purposefully do not give immediate feedback on the moral choices the player has to face: they created realistic ambiguous decisions that a civilian might face during the war, hence provoking reflection on ethical decision-making actions taken by the player in the videogame setting. Additionally, there is no good or bad choice: each character the player controls, may react differently, depending on the psychological profile of said character. Not having a clear moral compass like Mass Effect, This War of Mine enables constant reflection on the players' decisions: not having a right choice, a player faces complex ethical problems, resolved by the players' own ethical agency, that have to live with their choices.

An invaluable concept when discussing ethical gameplay, is *Ludic Phronesis* (Sicart, 2010) defined as "the practical wisdom that illuminates decision-making processes based on moral arguments in the context of game experiences" (p. 104). Sicart advocates for ethical agency by the player, supported by game design elements pertaining the sequence of play and the design of TWoM fits perfectly with Sicart's definition of phronesis. The fact that the player has to live with the ethical decisions taken, forces the fulfilment of the potential of consequences that derive from that decision, and the fact that there is no save-mechanic, allowing players to re-think their actions, if they are not satisfied with the outcomes, in

addition to the impossibility to have the same experience twice, considering that if the player wanted to start over, the dynamics would inevitably shift, give an immense power to the player's agency.

Throughout the game players will have to make uncomfortable choices, in order to succeed in their objective of outlast the conflict, but even the instrumentality of the decision begs for ethical questioning, which is one of the main reasons this was the game chosen for researching this topic: the player has to make a moral decision, but it is up to the player to decide when and how to take said decision. Learning experiences tied to moral decisions are directly correlated to the game developers' ethical compass: as they create the rules that regulate the digital environment, they also create the ethical ground on which decisions are made. It is from this ethical compass that players' morals can be revised: it is still a conscious decision for the players to internalise ethical decisions that stem from experiencing the videogame and incorporate them within their moral compass. This internalisation process is dictated by the emotions coming from the choices players have to make within the game, therefore falling in the affective learning domain.

3. Methodology

The research efforts conducted in this paper, and the subsequent results, have come from a longitudinal diary study and a following interview study. The reasoning behind the choice of a diary study, compared to other qualitative research methods, was that traditional learning processes do not occur instantly, or in one session, which can be developed through a questionnaire or an interview, but over an extended period of time: therefore, a longitudinal study was deemed more appropriate to answer the proposed research question, as follows the steps the participants take, regarding both the game and the players' reflections. Furthermore, the participants had to elaborate whilst writing the diary, on the concepts or emotions experienced during gameplay.

As Reis (1994) established in his publication, the paramount benefit of using the diary study method, is the possibility of reporting experiences and events in their natural context, providing insights, arduously obtainable with other methodologies. The research efforts give insights on meta-cognitive learning outcomes that may emerge when players are engaged in gameplay dynamics: such learning outcomes will be elucidated followingly.

The validity of the diary study approach lies in the depth of information gathered (Marshall, 1996): the number of participants was drawn out of convenience and due to what Marshall (1996) described as "thematic and theoretical saturation" that results after a determined amount of sampling. As Rapp (2015) explained, "diary studies involve repeated self-reports, that aim at capturing reflections, moods and events": the metacognitive learning outcomes are what the study effort at hand is aiming to investigate, and self-reflection on meanings and perceptions (Church & Smith, 2009) is what is asked of the participants of this research, in their diary commitment. Furthermore, diary studies support the evaluation of experience variation through the prolonged timeframe and the processes that determine said, possible, change in behaviour (Iida, Shrout, Laurenceau & Bolger, 2012).

The following section will outline the details of the diary study performed to answer the research question proposed by this investigation.

3.1 - Participants

A total of 10 participants played the *base game* of This War of Mine without additional content. The participants were all students at the University of Twente, either enrolled in a bachelor's degree or a master's degree, with an average age of 24, ranging from

18 to 26. The group was comprised of 7 males and 3 females, totalling in 10 participants, of which 4 had previous experience with videogames, whilst the remaining 6 participants were not engaged regularly in videogame activities in their day-to-day lives. The participants were recruited for the study for their interest in the topic and their willingness to participate in a week-long commitment, with a follow-up post-play interview. All the participants were given the same instructions, were given a format for the diary submissions, in order to make the data collection process as categorized as possible, which will be elucidated hereafter.

3.2 - Diary Study

The participants of this study were requested to play TWoM for 45-60 minutes per day, a minimum of 5 days a week, for a total amount of, at most, 420 minutes, minimum 300 minutes: this timeframe was presented to the participants to allow them to complete the game, with the specifics that were given, without exceeding the limit.

The diary which the respondents were asked to keep, had to be filled in within 30 minutes after the end of the playing session and in order to let the participants write freely, but a word-count limitation was posed. These suggestions were concerning the players' emotions during play, post-play reflection and practical information on their progress in the game narrative: being this research focused on learning outcomes elicited by affective (emotional) triggers, the inputs were in order to make the participants reflect on their playing activities and resulting effects, explained previously as metacognitive aspects of learning.

The following table was given to the participants, in order to aid their diary submissions: this was in order to maintain a certain structure amongst datasets, but no limits were given to the participants on topics to discuss.

Suggestion sheet given to participants, in order to structure their Diary Section.

Did the game mechanics/ game interface impact your game experience?
Did you feel invested in the characters, soundtrack, game narrative or other game aspects?
What emotions were elicited during your gameplay? (eg. happiness, sadness, melancholia, etc.).
Did the context in which the game is set impact your experience?
Did you feel ethically challenged by certain game aspects?
Did you have morally relevant decisions to make? If so, how did you tackle them?

3.3 - Pre-Diary Study Brief

Before initiating the diary study, the participants were given a digital copy of the game: in order to make them more confident with the game, the participants were briefed on the topics discussed in the videogame, in addition to the basic commands they would have used during their gameplay commitment. Moreover, they were invited to create their own character, or avatar, with the character creator available in the game and to select two other survivors of their choice, making the group controlled by the player amount to 3 characters. Once the characters were chosen, they were instructed to put the option "Days until ceasefire" to 40 days and "Intensity of Conflict" to moderate: this to ensure that the participants would be able to finish their scenario within the timeframe of the study, and ensure a difficulty that wouldn't cause too much disruption in enjoyment. The "Winter"

option had to be put on "Halfway Through", meaning it would have come at, approximately the 20th day of the scenario, leaving the *harshness* & *length* winter options moderate.

The participants were also given a number of locations which they had to select, in order to proceed to the start of the scenario, therefore the beginning of the game experience. The selection of the thirteen locations, is relevant for two reasons: for one instance, it ensures that each participant will face the same compendium of problems, randomly throughout their playthrough, and secondly it limits the randomness in the playing experience, leading to more accurate determination of relevant factors. The locations given to each participant are the following, in alphabetical order, that does not reflect the moment which the player will encounter them during their playing experience: *Abandoned Cottage, City Hospital, Hotel, Old Town, Quiet House, Ruined Block of Flats, Semi-Detached House, Shelled Cottage, Shelled School, Small Apartment, St. Mary Church, Supermarket and Warehouse*.

Once all these requirements were met, their gameplay would start, giving a little background on what the situation they were into and presenting the overall setting they would have taken actions into.

3.4 - Post-Study Interview

Once the week-long study had been terminated, the participants took part in the post-play interview section of the study. The purpose of the post-study interview was to confirm and expand on the diary entries data and to take personal participants' views into account.

Interviews were free flowing, to ease participants into discussing sensitive topics, yet structured and tailored to extrapolate further relevant data from the participants, in addition to what they had written in the diary submissions. The structure of the interview was dictated by the elements sought out in the research question, looking into the game experience elements that elicited metacognitive affective learning outcomes: emotions such as empathy, discomfort, perspective-taking and boredom were the ones looked upon during the interviews, and which elements of gameplay evoked such emotions. Other topics touched upon during the interviews were regarding the choices the participants made, and the consequences they had to face, gameplay elements that they found interesting, or not, the ethicality and morality brought forth from both the choices and the game elements, and other conversational elements, to ease the participants into the conversation. The interviews were recorded and transcribed, with prior consent of the participants, stressing on the anonymity of the participants, and were coded using a data-driven coding method (open-coding) as was done in the diary submissions.

The entirety of the data collected, both via diary submission and post-play interview, was not made public for privacy and security reasons. Furthermore, the transcriptions and recordings of the interviews were kept for the duration of the study and subsequently archived. All the participants previously accepted to have their interviews recorded for transcription purposes, and were informed about their archiving once the study came to an end.

This War of Mine could be seen as overwhelming by some, as it concerns complex topics such as war, survival, ethics, morality and difficult situations: it was part of the design processes, and so transpires through the game experience. In order to avoid post-traumatic stress disorders that could be elicited by the game, a de-briefing session was set up, with the possibility of speaking freely and openly without recording or transcription: it was up to the individual participants to leave this section of the interview out of the transcriptions. This was a pre-emptive action, as no participant raised any concern regarding this aspect of the research effort, neither during the diary redaction section of the study, nor during the post-play interviews.

3.5 - Data Analysis

The way the qualitative data was analysed utilizing Charmaz & Belgrave's (2007) Grounded Theory, in order to discover and underline patterns found in both the participants' diary submissions and the post-play interviews. The distinguishing characteristics of grounded theory methods include, but are not limited to: formulation of codes based on the data gathered, not from hypotheses, explanation of behaviour, its change through time, processes and theoretical sampling. Furthermore, Charmaz & Belgrave (2007) established that grounded theory methods are highly suitable for research efforts that aim at exploring social psychological topics such as emotions and personal experiences, which are what is being looked into in this study.

Since the base of this study was how are affective learning outcomes influenced by game experience emotional-priming elements, data-driven coding satisfied the needs of such question, discovering patterns extrapolated from the copious amount of data that has been gathered. In order to assess the interrater reliability of the data-driven coding scheme, Cohen's Kappa Test was utilized: the second coder was a peer master's student in Communication Sciences at University of Twente. The Kappa coefficient resulting from the data compared was .78, which is considered substantial agreement. The consensus of the codes was reached via analysing a substantial amount of data: the second coder was provided with the data and the preliminary codes resulting of the first analysis. The coder then proceeded to their own analysis of the bodies of text, with a subsequent comparison of the coding schemes. Once a consensus was reached via oral discussion, the final codebook was then drafted. The segmentation process was a step taken in order to draft the final codebook, as each coder either coded whole sentences, or blocks of text, or individual words that reflected the code in question hence codes might have been applied to an entire sentence, or attributed to a single word in the same sentence. The segmentation process clarified discrepancies between the two coding schemes, thus making the final codebook comprehensive of both coders' views.

The final codes derived from the data, will be elucidated in the following chapter.

4. Results

Before going into detail of what the participants talked about in the diary study and in the interviews, an overview of the details of both interactions will be given.

The diaries written by the participants were on average 1,500 words long, ranging from 2,206 maximum words to 679 minimum words: the minimal value was very below the average due to the fact that the participant wasn't able to complete the task, meaning the game came to an early end. That was the only instance of incompletion of the game, as all other participants did reach the end of the game. Participants did follow the schedule, playing the game within the days proposed by the study, in some cases extending voluntarily their interaction with the game in order to reach the *ceasefire*, meaning the end of the game. The diaries encompassed information regarding the story progression, main events happening during the game session, emotional states and reflections on various aspects encountered during the experience. Most of the participants followed the structure that was given to them, which gave them a determined structure for the overall diary writing. The interviews, instead, that were conducted post-diary writing, were informal in their structure. Interviews resembled a conversation about the game, and its aspects, elucidating further on the topics regarding the research question. Interviews lasted on average 45 minutes and even in the case of the

participant that did not complete the game were insightful, and deepened the knowledge of how the participants reacted to the game and the game's topics.

The following sections will give insights on the codes extracted from both the diaries written by the participants, and the following interviews: a pre-requisite for the interview was to have played the game This War of Mine and have delivered the diary submission to the researcher, in order to be able to discuss the game related topics.

The codes extrapolated from the dataset, were then divided into 3 distinctive categories: Game-Related Physical codes, Game-Related Affective codes and Game Artefacts codes.

4.1 - Game-Related Physical codes (GRPc)

Table 1. Number of instances of the identified Game-Related Physical codes.

Code	Diary Submission	Interview	Total
Mechanics	84	41	125
Narrative	52	34	86
Characters	39	25	64
Realism	36	14	50
Visuals	12	18	30
City	10	12	22

The most relevant effect amongst all participants, in this code categorization, was related to the mechanics. Mechanics, intended as a way of interacting with the digital world and the rules that make this interaction possible, was the most discussed & identified topic in both settings, diary submissions and interviews, as shown in Table 2. This can be understood as the players identifying and recognizing how they interacted with the digital environment, and the rules bound to said interaction.

Mechanics were not introduced to the player, as a conscious decision taken by the game developers, and this made some of the participants uneasy:

> *"It was very complicated at the start. I even felt stupid because I thought I was doing something wrong or I had missed something. The lack of explanations and the amount of things to do, were a bit, how do you say it, overwhelming. But as I played more of the game, it became clearer how to navigate the different aspects of it."*
> *(Male, 25 Inexperienced Player - Interview).*

> *"Game mechanics were nothing to be excited about, just what you would expect from a 2d sidescroller. And also the interface was quite slick, which made the experience a bit more liveable, but the lack of explanations or tutorials, was quite frankly inexplicable to me: it didn't make sense."*
> *(Male, 23 Inexperienced Player – Diary Session 1).*

> *"I'm not really used to these types of mechanics, but it wasn't too difficult to understand how to do things. It wasn't super complicated mechanically speaking. […] The mechanics I think they fit well within the system of the game."*
> *(Female, 22 Experienced Player – Interview).*

The mechanics had a direct impact on the narrative side of the game, which was the second most relevant topic of discussion. Narrative was viewed by the participants as either any information pertaining salience towards the main task the game entailed, intended as the

mere survival of the characters, or any detail that shed light into the background story of each character. Narrative was closely connected to character development, and consequently character impersonation, yet participants did not view narration as clearly defined.

> *"Was there even a story? […] the only thing I could see as a story, was the fact that the characters had a background and that I needed to make the people survive."*
> *(Male, 18 Inexperienced Player - Interview).*

> *"The story looked nice at the start, but did not evolve over time."*
> *(Female. 22 Experienced Player – Diary Session 1).*

> *"Narratively, still nothing special, still no link between characters. Every now and again the individual story of a character evolves, but it's just not doing anything."*
> *(Male, 24 Inexperienced Player – Diary Session 3).*

Other game related factors were the characters and how they were characterized by their look: although character reflection was found relevant, it was seen as storytelling by most of the participants. Characters were mostly viewed as vectors of previously mentioned mechanics, and were viewed mainly by the emotions they conveyed and not much consideration was given to their appearance. The creation of the participants' personal character, with their personality traits, was positively seen by the players, that had polarizing views on how their character reacted to in-game events.

> *"I liked that I could create my own character, and that it had its own personality. Sometimes it didn't reflect how I felt about things, but it was pretty amazing that my character had thoughts based on how I played the game."*
> *(Male, 18 Inexperienced Player – Interview).*

> *"Bruno had a questionable moral compass, as he did not question the fact that we stole resources, as the other people did."*
> *(Female, 23 Experienced Player – Diary Session 5).*

> *"The portraits of each character were very sad […]. Each story was different, and each one was very touching, for different ways. It made the characters have depth and made them more relatable."*
> *(Male, 25 Experienced Player – Diary Session 1).*

Visuals did not have much relevance for the participants, and in some cases, they were not even considered while the diary was being written. For the participants that did pay attention to visual cues, positive remarks were given as a whole, especially on the colour palette chosen by the game developers to portray the digital environment navigated by the characters. The visuals link closely to how the city, the major environment in which the players take their decisions, felt. The players did not have remarks regarding the fictitious city of Pogoren, if not for its realism aspect: players felt as if Pogoren was a real city, without having landmarks that would root Pogoren to a specific city. As Girod, Rau & Schepige (2003) detailed, affective learning encompasses cognitive, emotional and aesthetic dimensions: Visuals pertain to the aesthetic dimension. Furthermore, Visuals, seen as pleasurable instances, embody hedonistic purposes. As hedonia comprises short-lasting emotional states, visuals fit perfectly within the hedonistic system. Players either liked or disliked visual elements of the game, it was an immediate experience, pleasurable or not. The

feeling of the visuals did not change overall, as the visual elements remained seamlessly the same throughout the experience, but players could like the overall aesthetic style, disliking certain elements.

> *"The various locations that can be found anywhere, like a church or a supermarket, made it feel real."*
> *(Male, 25 Inexperienced Player - Interview).*

> *"The colour palette also was fitting, with dark colours all around, that gave a sense of instability and suddenty* (uncertainty) *to all locations. The city itself was interesting, relatable to many cities, not only in Europe."*
> *(Male, 25 Experienced Player – Diary Session 1).*

> *"I really enjoyed the fact that the city sometimes had some locations inaccessible due to the snow, in winter and the fact that so many places do not have an actual representation and so there can be a million of this city, per se."*
> *(Male, 23 Inexperienced Player – Diary Session 4).*

The city is the connection to realism, the last game relevant code identified in the diary submissions and the interviews. Realism was a fundamental element of the game, and it was indeed viewed as an important factor, linking the Game-Relevant Physical Codes to the affectively relevant ones, that will be described hereafter. Realism was not seen as a single entity, but always enticed to either a physical constraint, or an emotional one. Realism was an enhancer of the code paired with it: for example, when affective learning outcomes where enhanced by realism, the emotional aspects concerning the outcomes

> *"[…] their wellbeing felt real: if the house is cold, everybody gets sick."*
> *(Male, 24 Inexperienced Player – Diary Session 4).*

> *"The fact that you could see places where people tried to hide in every location, made it feel like the war happened very suddenly in this place, and that people tried to live how they could. Every detail I find makes it more realistic, and it makes it feel real."*
> *(Male, 18 Inexperienced Player – Diary Session 4).*

> *"Well, I'm not a big fan of science fiction and so on, but I am a fan of realistic stories, and this one in particular, felt real, like it could have been in a history book."*
> *(Male, 25 Experienced Player – Interview).*

In the following subchapter, the impact of realism on more affective relevant codes will be detailed.

4.2 - Game-Related Affective codes (GRAc)

The following codes, related to the affective domain, were divided subsequently into two further dimension, that had to be considered. As the affective domain is a vast and multifaceted category formed by emotions, the codes related to said emotions extrapolated from the dataset were divided into the self-reflective emotions and direct emotions, as both categories are radically different, yet fundamentally similar.

Building on what Russo & Benson (2005) enunciated in their study, which described how in order for affective learning instances to occur, positive and negative attitudes have to

be internalised by the players. From the data coming from both the diary submissions and the interviews, the following codes were extracted: information on the positive or negative attitudes that the players perceived at first and subsequently internalised, was retrieved.

Table 2. Number of instances of identified Game-Related Affective codes.

Code	Diary Submission	Interview	Total
Emotion Response	72	54	126
Empathy	47	41	88
Game Reflection	55	31	86
Willingness to Help	52	34	86
Ethical Challenge	44	33	77
Emotion Transposition	48	25	72
Perspective Taking	32	17	49
Perspective Change	6	2	8

Detailing the results from the diary submissions and the subsequent interviews, self-reflective codes were: Game Reflection, Perspective Taking, Perspective Change and Emotion Transposition. The remaining codes, namely Emotion Response, Empathy, Ethical Challenge and Willingness to Help codes, were categorized as direct emotions. Self-reflective codes were intended as active affective processes performed by the participants: contrarily, direct affective codes were seen as passive affective processes that influenced the participants.

Emotion Response was the code most identified in both settings, as much Mechanics was for GRPcs. This was because the Emotion Response code was the enabler for GRAcs: in order for other codes identified to take place, such as Empathy or Emotion Transposition, an emotional response from the participants had to occur. Emotion Response referred to the emotional dimension (Girod, Rau & Schepige, 2003), one of the integral parts of affective learning instances. All outcomes coming from the elements concerning this code were viewed as instances of *affective looping*, since players manipulated their digital surrounding via the emotions conveyed by other game elements.

> *"It came all at a surprise, and it made me feel very sad and helpless."*
> *(Female, 26 Inexperienced Player – Diary Session 2).*

> *"[…], I was relieved by the fact that a new person came to stay with us."*
> *(Male, 24 Experienced Player – Diary Session 2).*

> *"I was excited at the start, […] it became quite boring to do the same chores every day and night."*
> *(Female, 22 Experienced Player – Interview).*

Empathy, a fundamental primer of affective reflection and self-reflection, hence a primer for learning instances to occur, was viewed separately from other emotional responses and therefore coded separately. Due to empathy's emotional relevance in this study, viewed as one of the main outcomes of the research question, was also the reasoning behind the separate coding of the emotional occurrence.

> *"One of the characters got injured, after an attack, which made me sad and made me feel for her."*
> *(Male, 25 Inexperienced Player – Diary Session 2).*

"The characters fell into depression when my character didn't come back, which is what I would expect when a person living with you wouldn't come back, in a situation like that one."
(Male, 24 Inexperienced Player – Diary Session 2).

"[…] made me imagine what would I feel if something like that would've happened to me."
(Female, 23 Experienced Player – Diary Session 1).

The Game Reflection code entailed any self-reflective thought primed by the game experience, specifically on an affective level. Game Reflection involved an active role of the participant in the recognition of affective experiences. Game Reflection was the code that entailed meta-cognitive learning aspects of the videogame experience: since meta-cognition comprises awareness by the players of their learning intentions, players reflecting on aspects of the game demonstrated the ability to affectively learn from the interaction with the digital environment.

"[…], but it gave me the opportunity to reflect on what I was doing, and how I was dealing with things."
(Male, 25 Experienced Player – Diary Session 3).

"Well, maybe I wouldn't be so clear headed about things."
(Male, 18 Inexperienced Player – Interview.)

"I would probably not be so heroic in a situation like that one."
(Female, 22 Experienced Player – Interview).

The Willingness to Help code, was comprised of all data fragments that closely concerned willingness to help, or not help, sentiments directly primed to the participants. Willingness to Help was closely connected to ethical challenges, as the intention to help was mostly primed when ethical dilemmas were posed. As Dormann & Biddle (2008) enunciated, emotion is a vital element in decision-making processes: Willingness to Help entailed a conscious, defined emotional component that defined the game experience of the players. Furthermore, Willingness to Help was one of the intended affective learning outcomes proposed by this study.

"I wanted to make a difference, and wanted to help, but it backfired."
(Male, 25 Experienced Player – Interview).

"One night I had the choice to save a girl in the supermarket, but I didn't have anything to fight against what looked like a soldier, so I just ran."
(Male, 24 Inexperienced Player – Diary Session 3).

The Ethical Challenge code encompassed sentiments expressed by participants concerning these ethical & moral dilemmas. Due to the settings given to the participants, the ethical challenges encountered during gameplay were the same, yet randomly encountered, making it easier to detect the sentiments of the participants. The elements pertaining this code were experienced at different times during each player's playthrough, allowing for freedom of choice whilst pursuing their own chosen path. The fact that the event were specific to

determined locations within the city of Pogoren, made it possible for each player to experience the game in a unique way, developing their own narrative as ethical challenges arose.

> *"[…] trying to steal from raiders in order to ensure a better survival for my characters."*
> *(Male, 23 Inexperienced Player – Diary Session 3).*

> *"The fact that the resources are not easily found, made me decide to steal from an old couple in their house."*
> *(Male, 18 Inexperienced Player – Diary Session 3).*

> *"The only thing I decided not to do was not to rob an old couple."*
> *(Female, 26 Inexperienced Player – Diary Session 1).*

The Emotion Transposition code implies that comprehensive elements of the affective domain provoked by the game experience have been transferred by the player to the game, in reaction to dynamical impacts and after an individual's reflection. Emotion transposition reflects the affective loop conceptualization perfectly: the participants expressed their emotions via the interaction with the digital environment and reactively the game generated affective priming expressions, that were ultimately acknowledged by the participants, which felt more involved and responsible of the characters they played as.

> *"I think that was a big part of what I was feeling, tension when there was tense moments and relaxed or less tense when I was in the house."*
> *(Female, 23 Experienced Player – Interview).*

> *"[…] it really felt like I had accomplished something amazing."*
> *(Male, 25 Experienced Player – Diary Session 5).*

Perspective Taking was considered the step prior to Perspective Change, hence the limited identified Perspective Change codes: perspective was first taken, where players identified with others, and in limited cases, this gave space to a change in attitude. This attitude enticed the participants' views to the characters viewpoints. Perspective Taking and subsequently Perspective Change, were outcomes that were expected to be present relating to affective learning, as they are the ultimate goal of the game This War of Mine.

> *"I understood their frustration and sense of despair, as I could feel it too."*
> *(Female, 23 Experienced Player – Diary Session 3).*

> *"I gave them my extra supplies, as I think I would do."*
> *(Male, 25 Inexperienced Player – Diary Session 4).*

4.3 – Game-Related Artefacts

Ultimately, the codes that did not fit in the previously detailed categories, namely Game-Related Physical and Affective codes, yet they share a one specific characteristic that made it so it could be possible to group them: they all relate viewing the digital entity of This War of Mine as a game. The participants of this study approached the TWoM as a game, rather than a simulation of the real world, even if the digital environment portrayed is

seamless to the real world. Therefore, the following codes were linked to instances where the participants openly recognized This War of Mine as an artefact.

Table 3. Number of instances of identified Game Artefacts codes.

Codes	**Diary Submission**	**Interview**	**Total**
Opinion TWoM	43	13	56
Context	25	15	40
Music	24	8	32
Opinion Videogames	4	6	10
Replayability	4	8	12

Music was considered as pertaining to the game environment for numerous reasons: it is rooted to the digital environment of the game, yet what was considered by the participants was the emotional dimension of the soundtrack, and its affective valence, in its digital-ness.

> *"The music was in my opinion, amazing. It really was a big part of the whole setting. It was always right. It always set the right tone."*
> *(Male, 18 Inexperienced Player – Interview).*

> *"My biggest complaint was the music. It was nice at the start, but already after the first session I had listened to it so many times, being so repetitive, that I couldn't stand it a lot."*
> *(Female, 22 Experienced Player – Interview).*

> *"The music seems to be adequate in every situation, somber and repetitive when it has to be and suspenseful in tense situations and no music in extremely suspenseful situations."*
> *(Male, 24 Experienced Player – Diary Session 1).*

The Context code identified information regarding either the context in which the game was played, or information regarding the context of war. Players however did not detail extensively their personal context or the environment in which they engaged in the playing experience of This War of Mine.

> *"I like that it looks like any city and like no city, it could be anywhere in the world, just like war can be anywhere in the world."*
> *(Female, 22 Experienced Player – Diary Submission 2).*

Replayability codes ascribed information regarding the act, or possibility of, playing the game beyond the scope of this research effort, which gave information on the enjoyment and motivation that participants experienced during either the diary writing section or the interview. The elements concerning this code were linked to instances of hedonic gratifications (Oliver & Raney, 2011) as the videogame experience was viewed as a pleasurable one.

> *"I don't know if I would play the game again, but I didn't dislike what I saw."*
> *(Male, 24 Inexperienced Player – Diary Session 5).*

> *"I will probably play it again, maybe with different characters."*
> *(Female, 23 Experienced Player – Diary Session 5).*

Opinions about This War of Mine and Videogames were codes that related on solely comments about either the game played by the participants, or the totality of the videogame industry. These opinion were viewed as separate codes because of the views that the participants had about the game, or videogames as a medium. This was in order to understand motivational aspects of their engagement in the research, integrating them to construct a more in-depth view of the eudaimonic gratification coming from the engagement with This War of Mine.

> *"[…] especially after such an emotional conclusion, I really enjoyed this game."*
> *(Female, 23 Experienced Player – Diary Session 5).*

> *"[…] the game has been very difficult. And there are a lot of choices to make in the game […]"*
> *(Male, 24 Inexperienced Player – Diary Session 4).*

The most relevant link amongst all the variables explained previously was the one between Ethical Challenges and Willingness to help. Although there is a clear topical connection between the two elements, considering that both belong to the identical category of ethical and moral values, these elements were the elements mostly connected and individualized by participants: yet emphasis has to be put on how this link was created.

The setting of the game was made in order to have similar game experiences amongst the participants, yet not an identical one: the first contact with an ethical challenge occurred, by design, in the first instance of playing the game. Both participants with relevant prior experience with videogames and participants with less experience with the videogame medium had to spend a considerable amount of time understanding the nuances of the game, but when stumbling upon a challenge with ethical implications two different outcomes surfaced: participants with less experience in videogames, were more inclined to help, regardless of possible ramifications of their acts, whilst gamers were more reluctant, to a certain degree. Inexperienced Players did not reflect on instrumental consequences of their actions, if not after the command for helping was issued, meaning that the choices made by the players were dictated more often by their instincts or moral codes. Contrarily, in most cases Experienced Players expressly reflected on the instrumental implications of their actions, leading to the assumption that they contemplated different options before lending a helping hand. The learning process occurred similarly for both groups of participants, but yielded as many different outcomes as there were participants: each participant aligned their own moral codes with the ethical code portrayed in This War of Mine, where the difference between good and bad are thin. When the individual moral code aligned with the ethical code, it gave positive feedback, reinforcing the participant's moral code, when clashing, learning instances occurred where it was up to the participant to reflect on their own actions and make a conscious decision to either review and adjust their own moral code to the ethical code portrayed in digital environment, in this instance we can describe it as persuasive outcome, or participants could simply acknowledge the difference in moral codes and reinforce their own vision.

Differences occurred also when faced against a similar challenge: helping the neighbours, for example, was the identifiable reoccurring experience that served the purpose of understanding these implications. In the game, randomly throughout the day section of the game, an instance could occur where neighbours could come to the player's shelter, asking for help in some cases, in form of help to acquire resources from an air drop, or in other cases, in the form of request of resources. In both cases, it was up to the player to decide

whether or not to help these non-aggressive civilians. This showed how participants, unconsciously, followed procedural rhetoric persuasive actions: real world axioms portrayed in the virtual setting led to affective learning instances, that ultimately allowed for affective learning outcomes to appear: these outcomes were empathy, perspective taking and change and willingness to help.

This led participants to positive interactions with the neighbours, either giving the resources required, or sending one of the player's survivors to help acquiring the resources. In the case of acquiring the resources from the air drop, two outcomes were possible: either the survivor came back, with their share of resources (positive outcome) or the survivor did not come back, as a result of the circumstances (negative outcome). Usually the first time the players encountered an ethical challenge such as this one, meaning that a decision based on self-assessed morally imbued values had to take place, the response was positive: they either helped, or gave the resources, if they had them at their disposal. But when facing negative feedback, this made the players act negatively towards previously positive reactions. This would lead to the assumption that positive feedback fosters positive affective outcomes, whilst negative feedback is more likely to ensure a retraction from positive affective outcomes: players seem to learn from the game that ethical responses aligned with their previously interiorized moral conceptions, lead to positive reinforcement of said conceptions. In limited instances, a negative initial response, following the participants' moral code, was then shifted towards a positive response in the second instance, meaning that the participants, based on the outcome of their first decision, interiorized the affective-inducing concept of the game's response that translated into a revision of interiorized moral concepts, that then lead to a positive action, where before there was a negative one. In both instances, nevertheless, there has to be a conscious decision from the player:

Concluding this subsection, willingness to help related closely to ethical challenges posed by the game developers, either actively reinforced positive ethical decisions, which could be still considered as a learning outcome, or a transition occurred from negative moral choices to positive ethical decisions, as a result of affective responses.

5. Discussion

Research efforts examining the effects of videogames on players are numerous, yet a lack of field research is evident. This study was performed with the intent of obviating said gap in academic research surrounding the topic of affective learning in videogame digital environments and provide the groundwork for future analyses in this articulated field. Furthermore, this research aimed at being a founding bridge between literature and real-world interactions, that players experience daily.

In order for affective learning to occur, not solely in digital environments, emotions have to be priorly experienced: since affective learning is the process of internalization of positive or negative attitudes (Russo & Benson, 2005), it is not a simple task to identify which single element specifically has an affective impact on learning processes. The research performed during this period of time revealed how different elements, combined with each other, primed emotions in players and how in some cases, affective learning occurred.

This chapter will explain technicalities of the formation of affective learning instances occurred during the research efforts, either bridging the gap amongst previous academic efforts, or detaching from them.

The coming relevant links that will be detailed, all fit in the category of physical game relevant codes and their link to emotional responses. Mechanics and Realism led to emotional responses in the participants, obviously for very different reasons, in some cases jointly contributing to affect-priming learning instances.

Mechanics, generally, were viewed as poorly explained, which drove participants to feel resistance and distance from the game: most participants detailed how the initial difficulties of learning the rules and regulations entailed in gameplay was restraining, yet only one participant did not manage to finish the game. However players expressed favourable comments on how the commands issued to the characters felt responsive and intuitive, which supported learning processes of the simple, yet complex mechanics within the game rule system. These learning processes, as time passed, made the players feel less overwhelmed and led to cognitive relief (Förster, 2014), that in turn gave space to more reflective assumptions, which meant more cognitive space for learning instances to occur. Learning instances related to Mechanics were mainly instrumental to the game, but in some cases these instrumental learning processes evolved into affective learning processes. Mechanics themselves did not lead to affective learning processes to occur, but made so that affective learning would take place: indeed it was reported that Mechanics enhanced empathy-related feelings.

Realism, on the other hand, was considered with a positive connotation and contributed to the overall appreciation of the game. Realism deepened the connection the players had with the fictional characters, or setting, and made the empathy-driven decisions more impactful. The feeling of relatedness felt by the players enhanced their perception of the importance of their decisions, and the weight they carried both instrumentally, to the game, and emotionally to the players themselves. This can also be seen as a positive outcome driven by game elements, as players' experience contributed to feelings of immersion and feelings of thoughtful decision-making, affecting their decision-making processes more effective in real-life conditions. Realism affected emotional responses and indeed this connection was found relevant to players that related realism as the one of the main factors determining emotional outcomes. Fidelity to reality was one of the most identifying features that 11Bit Studios sought whilst developing TWoM, hence realism was a driving factor of the game experience.

The game experienced by the participants, did not have a clear-cut, linear narrative: it varied for every player, although with restrictions based on the setting on which the diary study was set. This free-flowing narrative was not consistently observed to be relevant in emotional responses, yet it was seen as character-building narrative. This led participants to root narrative elements to character development, which subsequently prompted empathy towards the characters, and self-reflection towards the personal character: hence narrative itself did not influence directly affective-learning processes, yet contributed to the formation of affect-priming instances via the influence of a different element, namely Characters.

Characters were viewed differently, depending on the relationship the players built with them: with their personal characters, perspective taking was the predominant process that took place, followed closely by feelings of empathy. Viewing their personal character as virtual representations of themselves, in some cases led to viewing as spectators the actions of the virtual self, prompting reflection on the characters, which can be viewed as self-reflection in virtual self, which had effects on the personal self. Linking this outcome to what McCreery, Krach, Schrader & Boone's (2012) found in their efforts, the equivalent projection of one's psychological characteristics, is more than an equivalent persona. This equivalent projection is described as functioning amongst the other game elements in which the projection is able to exist, and in this case, the projection co-existed with the mechanics, the other characters, the city and all the other previously detailed elements that compose the game and the dynamics that intertwine within it. This leads to the assumption that this duplicity of psychological characteristics can be bridged, and in some cases, this can lead to the conjunction of these emotions, which seems to unify the two psychological profiles. This

would explain how emotions elicited in the videogame environment are reflected on individuals, via the personified characters that inhabit the digital game.

Not thought of as a prominent game element, or not a notable element to influence affective-learning processes, Music was found relevant when concerning the affective dimension. Music was viewed for the most part as a good background for the instances that played before players' eyes, enhancing tense moments of gameplay or mellowing more tranquil sections of the game. Participants linked music to Mechanics, to the rules that defined the game experience, therefore viewing them as a separate entity from the digital environment that construed TWoM. Although Music itself did not influence learning processes, audio cues guided emotional states in the participants which distinguished more tranquil sections of the game from more hectic ones.

As Munday (2008) pointed out, digitally built environments do not have natural sounds, therefore the importance of music and sound effects is vital to ascribe meaning. The sound of the game was polarizing: either it was extremely enjoyed, or it was found redundant and not pleasant. Nevertheless emotions were elicited in the players, regardless of the positive or negative connotation given to the music.

The emotional responses, triggered by a multitude of game elements, elicited affective-learning processes, such as perspective taking, empathy and self-reflection. The emotional responses were found to be the primers of affective-learning processes to take place, ultimately leading to what was expected to be identified from this research effort.

A closer look into the data derived from the study, shows an evolution of the players' perspective regarding the digital environment: from a more instrumental and practical view of the digital environment, detailing its mechanics and its features, to a more reflective view on how mechanics were functional to the game and a more characterized perception of the virtual-self in the digital environment.

In order to answer the research question posed by this study effort, propositions dictated by the results are given.

Realism is a relevant factor contributing to affective learning: this is intended as realism within the contextuality of the digital environment described in the videogame. Videogame literature, holistically, is vast and multifaceted incorporating historical literacy and science-fiction literacy: videogames in most cases touch upon at least one context. In order for affective learning instances to occur, realism and context must be aligned, meaning that discrepancy amongst contextual elements and realistic elements of the digital environment portrayed might hinder the surfacing of learning instances. A videogame portraying representations of historical events with a time-travelling mechanic, might detach the player from the digital reality, if this mechanic is not contextualized accordingly. In the case of This War of Mine, realism contributed to affective learning occurrences due to the fact that events taking place in the digital environment were contextually aligned with the reality portrayed.

Mechanics, viewed as the way players interact with the digital environment and the rules that regulate this interaction, have to be either detailed thoroughly when first encountered, or easily retrievable by the players, in order to enable the players to be eased into the game experience and allowing for emotional responses to occur. Mechanics themselves, as previously stated, do not impact directly affective-learning instances, but create the environment in which these instances are allowed, and if this environment is not user-friendly, players resist the learning occurrences.

Affective-learning outcomes, namely empathy, perspective taking and self-reflection, were direct outcomes of Game Experience features provoking emotional responses to the players. The identification process that derives from the virtual-self in the digital environment

leads to the assumption that affective-learning processes that impact the digital persona, are reflected on the individual player.

Conclusively, in answering the research question *"How are learning outcomes, experienced through videogame playing experiences, impacted by emotional driven primers stimulated by Mechanics, Context, Narrative and Ethics?"*, driven by the information resulting from the participant's interaction with the videogame environment, the relevance of these features is contextual to the game in question. Affective learning outcomes stemming from the interaction between players and videogame playing experiences, are mostly a complex intertwinement of all the elements of the game elements, although the elements contribute in varying degrees. Mechanics created the environment in which affective learning instances could occur, setting the rules and defining the possible interactions that the players may encounter. Narrative, conjointly with the mechanics, tailored the virtual environment that the participants traversed, at their own pace. Narrative elements within the game, written by the game developers, gave a purpose and a goal to achieve: how players achieved it, was a choice made within the rules set by the mechanics. The micro-narrative elements that the players ascribed within the game experience pertained mostly into the players eudaimonic and hedonic gratification system, which enabled enhancements to affective learning instances. Via ethical and moral revision, affective learning occurred: due to the valence of these two elements in both digital and analogic, real world, environments, affective learning was possible. Due to the individuality of the personal contextual elements and the game related contextual elements, Context was the element that was the most complex to relate to affective learning outcomes. As contextual details that revolve around game developers, players and the analogic world in general, continuously evolve, picturing Context as fundamental element of affective learning instances would provide solely a snapshot of this ever-changing reality. Therefore, Context resulted in being a controversial element that needs to be defined holistically, before taking the step to portray it as a vital element of affective learning.

5.1 Limitations and Future Research

This War of Mine is revolutionary for multiple reasons, but the fact that it is a bridging game, connecting serious games to commercial games is probably the quintessential property of the game, that makes it so unique.

The limitation of the research mainly are based on the fact that only one game's affective priming capabilities: if games coming from different categories, such as multiplayer games, or games that tackle issues from a different perspective, like shooter games, would be looked into, the affective learning valence of videogames would become clearer and would provide a holistic view of such valence.

Another limitation of the study at hand, is the participants. With more diversification in the population, new outcomes may come to light. The participants in this case were all in their twenties, studying at a university, in one country. A more extensive and detailed study effort could be made to fill the gaps age-wise, since videogame players now range to two, or maybe even three, generations, education level-wise, as digital game environments permeate all structures of society, and nation-wise, as videogames are played all around the world, hence cultural differences might influence affective-learning primed instances and outcomes of these instances.

Ultimately, the observation endured for a maximum of 7 days: with a longer study, more in-depth and accurate ramifications of affective learning could be identified and categorized, and their relevance would come afloat with more prominence. As learning is not

a simple and linear process, a longer study effort would be able to detail more precisely to what degree affective learning instances are influenced by Game Experience elements.

Since the scope of this exploratory study was to investigate whether affective learning processes were induced by videogame elements, there is no quantitative support to the allegations, which could be also researched in future endeavours.

Lastly, the participants could have been aware of the scope of the research, influencing their view of the experience: this could have had an impact on the results stemming from this research. It is not implausible to believe that the participants learnt because of the research effort and not because of the game experience they took part of.

5.2 Conclusion

Tavinor's (2009) view of videogames, as *cultural platypuses* that evolve into a more refined and culturally relevant medium, is fitting of this study: videogames do not shed light only on the subject of observation, but on the whole discipline from which it comes from. As the discovery of the platypuses revealed valuable scientific insights about the two biological domains – mammal and reptilian domains – the same could be said of videogames, that reveal insights on more than one field of research. This rings true when understanding that this research effort was exploratory for many reasons and for this reason it raises more questions, than it gives answers.

The results show that videogame elements do indeed elicit affective-learning processes in participants, although in varying degrees. The scope of this study effort was to discover if videogames could be conveyors of emotions, yet the *why?* and the *to what degree?* levels remain unanswered.

Further field research on the effects videogames have on players is fundamental, especially because of the growing intensity with which videogames are gathering more attention from more institutionalized entities and are becoming more a more identity forming (De Mul, 2015). Videogames are becoming more prevalent in people's lives, therefore constituting a more consistent part of identity formation in players (De Mul, 2015): yet research is focused more on the theoretical side of the field, and not as much on the actual effects videogames have, which are in dire need of more extensive studies. Since videogames are such a multifaceted medium, constraining this research creating a model would have been detrimental: too many variables, more than the ones that were found, would have cluttered the results with unneeded information, needlessly damaging the value of this experimental research.

In order to contribute to the growing conversation regarding the affective relevance of videogames, this study effort shows that diary studies are a more than valuable method to investigate how players navigate digital environments and what players think whilst engaging with digital worlds. Combining multiple longitudinal studies would ultimately lead to a more complete, and extensive, understanding of motivations and meanings that players experience and understand the underlying processes that come from said experience.

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