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2007

In The Game : An Exploration of the Concept of Immersion in Video-Games and its Usage in Game Design

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For the Degree of BSc – Digital Media Honours

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An exploration of the concept of immersion in video-games and its usage in game design

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USE OF THESIS

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ABSTRACT

This thesis outlines a research project whose aim was to develop a design taxonomy for the creation of immersion in video-games. These guidelines can then be used in-sync with different stages in video-game design and development to ensure an immersive experience. Integral to this is the 'suspension of disbelief' the end user experiences when fully immersed in a video-game (Holland, 2002; Mediacollage.com, 2006).

A review of the literature has identified the major contributing theory to the concept of immersion as flow (Csikszentmihalyi, 1991). Flow embodies cognitive elements of involvement such as concentration on a task, completing a challenge, having control over the environment and so on. This cognitive flow is also integrated with affective components such as the loss of self consciousness and sense of 'oneness' with the environment. A model of immersion has been proposed that embraces the cognitive aspects of flow through the gameplay elements that have been integrated as well as the affective dimension of identification which can be achieved through the integration of narrative elements.

Immersive gameplay is framed within the nature of the challenges the user faces. These vary, such as the psychomotor challenges inherent in platform games and shooters through cognitive challenges of quizzes and tutorials through to social challenges such as multiplayer online environments. The criteria for cognitive flow embrace but also extend on traditional theories of motivation. Concepts such as challenge and control (Astleitner & Weisner, 2004) combine with the relevance and confidence inherent in Keller's ARCS theory of motivation (Rezabek, 1994) to describe the contingent aspects of gameplay. An understanding of these within the context of game goals, challenges, rules, boundaries and feedback can assist designers in applying appropriate criteria to ensure deep cognitive engagement on the part of the end user.

Playing a game, however, is also an emotional and aesthetic experience. The term 'emotioneering' (Freeman, 2003) has been used to describe the ways in which designers create a sense of involvement with the game. These include traditional motivational constructs such as curiosity/attention, satisfaction and fantasy, and can be disaggregated to a range of criteria that may be used to guide the development of the affective aspects of gaming including player enacted narrative and role-play, the affective and the range of 'interesting' and 'deepening' techniques that can add emotional depth and complexity to the game world (Freeman, 2003) through visual and narrative design elements.

The criteria developed from the immersion model are proposed as a lens to assist designers in understanding this state-of-mind. These criteria have been applied through the analysis of the use of existing games in a study on undergraduate students in game design and culture to ascertain their validity, and with the goal of providing guidelines for the future design of entertainment as well as serious games.

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Cesar Manuel Saez Ojeda (31/03/2008)

Acknowledgement

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INTRODUCTION

The main topic of this thesis is to explore videogame immersion, a state of mind that is often talked about and experienced, but very elusive to design and implement. This guides the focus of this thesis: what videogame immersion is and how it can be accomplished from a design point of view. To do this, we need to find out what aspects of videogames generate this state of mind and see how an understanding of these factors can aid us in designing for such an experience in commercial and 'serious games'. This thesis will explain and outline the background and significance of the study, the literature used to frame the study, the methodology used during the research and the conclusions based on the findings.

BACKGROUND

The first commercially available videogames were introduced in the early 70s in the form of the coin operated arcade machine. By the end of the 80s and early 90s, the shift from arcade videogames to console and computer games was in full effect (DeMaria & Wilson, 2004). Nowadays videogames seem to have found their way onto almost every electronic gadget imaginable, such as watches, calculators, mobile phones and portable music-players. This has enabled videogames to be played by virtually anyone at anytime, anywhere.

Most of us have played a videogame of some sort at one time or another. This should be no news considering their availability and our enjoyment of being challenged and entertained at the same time. However, the most classic misconception is that the typical videogame player is a geeky-looking teenage boy with no social life, while over 40% of videogame players are females from the age of 25 to 49 (Fattah & Paul, 2002). This shows that sex does not play a role in who enjoys playing videogames on a regular basis, and neither does age. In fact, the oldest professionally competitive videogame player was an 80 year old woman who was a world champion of the arcade game "Q*bert" (Eurogamer, 2005). Nevertheless, the main target audience for videogames is clearly the young and adolescent.

The accessibility of the medium combined with our enjoyment of challenges and entertainment has aided in the popularity and widespread usage of videogames. They are predominantly used as entertainment products, and their success indicate that the

worth of the videogame industry will exceed the total of both the film and music industry in a few years; revenues are set to increase from around $30 billion in 2004 to over $70 billion in 2009 (Moses & Murray, 2006). These large sales figures show how attractive and appealing videogames are to its target audience, as well as displaying the potential videogames can have as a medium if used appropriately as a learning platform. The current academic focus on the analysis and development of 'serious games', videogames where the primary aim is to teach rather than entertain, confirms that the videogame medium is here to stay.

SIGNIFICANCE

There should be no doubt in people's mind that videogames are immensely popular as an entertainment product and are now emerging as a medium which can be used for learning purposes. This means that there are several things that can be gained by studying videogames and those who play them. Since videogames have the possibility to engage a very wide audience; small children, young adults and even mature adults enjoy playing videogames, studying and analysing video-game phenomena will allow us to achieve a greater understanding of why this medium is so engaging and immersive.

The engrossing feeling that videogames can generate is a double edge sword. Videogames have the tendency to absorb the user in a strong and influential way which can be a good and a bad thing. This strong factor has caused many heated political debates which lead many to believe that video-games are solely to blame for the rise in the compulsive psychological disorder called "game addiction" (MediaWise.org, 2005; Orzack, 2003; Schlimme, 2002). There have been few death associated with this type of addiction (Journal Sentinel, 2002; Video Games, 1982), the latest was a 28-year-old South-Korean man who died of heart failure from exhaustion. He collapsed after a 50 hour session where he barely ate and slept, and died shortly after arriving at the hospital (BBC, 2005). However, any substance or activity can be addictive, which is why moderation and responsible usage has to be applied at all times. The positive side of this addiction factor is that it can be used to absorb users in a particular activity. In terms of developing a 'serious game' that would be able to

create the same level of 'addiction' in the user, the outcome would not necessarily be such a bad thing.

By identifying the factors of video-games' 'immersive property' we can create a taxonomy that will guide us when trying to reproduce this engrossing feeling more accurately and effectively. With the understanding of these properties, we will generate a set of tools that can be used in the design phase to determine and ensure that the videogame developed will manage to engage, engulf and eventually immerse the game player. This toolset can then be used in the development of entertainment- and learning-based products.

RESEARCH AIM & QUESTIONS

The aim of this study is to find out what constitutes an immersive video-game experience. This aim can be achieved by answering two research questions, which have been outlined as follows:

- What aspects of games make them immersive?
- How can an understanding of these factors help guide video-game design?

LITERATURE REVIEW

Today, a great variety of people play videogames. Depending on their level of engagement with this activity, be it on a cognitive-, affective-level or both, the state-of-mind generally known as immersion is generated. This mental state bears a resemblance to the literary term "suspension of disbelief" (Holland, 2002; Mediacollage.com, 2006) where, even though one knows that what one is experiencing is not real, one is willingly engulfed in the activity (Oudshoorn, 1999). This literature review will focus on identifying the different elements that play an important part in the creation of videogame immersion.

There are three terms used in this literature review that are very broad in nature, and need to be identified and explained. These are gameplay, narrative and identity. The term "gameplay" is a simple, yet highly complex, term. In relation to this paper, it refers to all the cognitive actions the game-player can attempt to do with the game and its game-space (Salen & Zimmerman, 2003). This includes the way one physically interacts with the game and the use of the game mechanics. The term "narrative" is used to explain the choice of structure and storytelling elements the videogame uses as well as any information that needs to be conveyed to the game-player. These elements come from narratology and consist of the characters, the plot and the setting of the game (Manfred, 2005). The term "identity" is used to put in words how the game-player consciously and subconsciously thinks, feels and sees him- or herself while playing a videogame (Smith, 2007).

Video games are such complex software applications that trying to figure out all the aspects that work together to create an immersive experience would be an immense task. Several attempts have been made, such as trying to classify levels of immersion depending on the point-of-view used in a videogame (Taylor, 2002), immersion generated from narrative, aesthetics and identity (Douglas & Hargadon, 2001; Frasca, 2001) as well as from different aspects of the gameplay experience (Ermi & Mäyrä, 2005). Others have tried to explain immersion by showing links between itself and Csikszentmihalyis' theory of the "flow state" (Holt, 2000; Sweetser & Wyeth, 2005), which mainly refers to the psychological state when one is deeply concentrating on a given task and enjoying it at the same time to the point of losing oneself in the activity

(Csikszentmihalyi, 1991). Despite the fact that these studies approach immersion from a very specific points-of-view, they help guide the way in what is needed to create a clear, overall picture of the elements that are required to generate immersion, or the different levels of it.

The broader academic focus on videogame research, commonly referred to as game studies, has gone through a debate between so-called ludologists and narratologists about the nature of videogames (Frasca, 1999; Frasca, 2003; Murray, 2005; Pierce, 2005). The focus of this debate has been to try and find out what videogames are from an ontological point of view, if videogames should be categorised and studied as stories or games, narrative or gameplay. That discussion does not concern this paper, as the focus is on a specific experience that videogames generate in their users. Still, these opposing theories have a function in defining two important aspects of games that will be looked at: the idea of using narrative elements, such as aesthetical codes, characters, and stories to engage the user. These are things that relate to the visual and conceptual design of the game world and the inherent story or plot. The gameplay elements are defined in terms of the specific challenge provided to the user and the interactions that lead to the completion of the games goals.

Nevertheless, their discussions reveal that videogames have two strong and very influential aspects, gameplay and narrative, which complement each-other to create what we call a videogame. Motivational design theory (Rezabek, 1994; Wong, 1996; Dempsey & Johnson, 1998) lends itself well to try and understand why people play videogames, and "emotioneering" (Freeman, 2003) comes into play when looking at narrative and how people generate emotional connections with parts of the videogame. By examining these aspects and their connection to the "flow state" (Csikszentmihalyi, 1991; Falstein, 2004) and personal identity (Rheingold, 1991; Turkle, 1994; Sanes, 2000) we can come closer to an understanding of how videogames can become so immersive and time consuming.

SCOPE

This literature review will critique the various theories introduced earlier and try to determine how they influence the narrative and gameplay aspects of videogames. These are the main characteristics of a videogame, and must play a role in providing

the user with an immersive videogame experience. Since immersion itself has only been studied in specific circumstances rather than in an overall manner, the concept will be examined and analysed to determine how gameplay, narrative and identity come together to create this immersion.

To accomplish this, we need to critically look at flow and motivational theory and how they relate to a videogame experience. This has been done in the "flow & motivation" and "gameplay" sections of this literature review. We also need to look at how emotional connections with the game world and personal identity come into play in the construction of immersion, which has been done in the "identity & emotions" and "narrative" sections of this literature review.

FLOW & MOTIVATION

The concept of flow should not be hard to understand because most of us have experienced it one way or another. On a very basic level, having an experience of flow means nothing more than being happy with yourself and what you are doing at that point in time. Csikszentmihalyi (1997, p. 46) refers to flow as the sensation "of intense living against the dull background of everyday life", and goes on to call it an "optimal experience". This means that flow can come from a multitude of activities; they can be interactive as well as passive, for business or for pleasure.

Motivation theory has always played a strong part in interactive multimedia, especially in the field of electronic learning. The way most motivational theories work at trying to challenge and motivate the learner has strong relations to how flow is achieved in non-educational activities. Randall Rezabek (1994) developed a framework for developing intrinsic motivation in learning products by employing flow theory, as well as John Keller's motivational design theories.

THE FLOW STATE

Yet, just being happy does not constitute a flow experience. To truly achieve flow, one must concentrate on the task to the point of being absorbed so that no outside stimulant can disturb the pleasure or enjoyment of it (Salen & Zimmerman, 2003). To be able to achieve this focus and engrossment, the game-player has to volunteer for the activity knowing that the task at hand will provide sufficient challenge to the game-

player's skills in the area, as well as being a task that the game-player feels confident that it will be completed. The activity has to be designed in a specific way, it cannot be too hard or too easy, that ensures the game-player will continue playing the video-game. Without this, the game-player will feel discomfort or lack of interest in the activity. One of the main points about flow that Csikszentmihalyi (1997, p. 71) tries to get across is that the activity has to be enjoyed "for its own sake, and to know that what matters is not the result, but the control one is acquiring over one's attention". Inevitably, whenever flow has been experienced, the user will keep repeating the activity just for the sake of it, even though there is nothing new to gain other than experiencing flow again (Johnson & Wiles, 2003).

According to Csikszentmihalyi, eight components are necessary to achieve flow. Three of these have already been mentioned, here is a list of all eight (Salen & Zimmerman, 2003; Johnson & Wiles, 2003):

- A challenging activity
- Concentrating on the task
- Clear goals
- Clear Feedback
- Being in complete control over a hectic situation
- Engrossment in the activity
- Loss of self-consciousness, becoming 'one' with the machine
- Altered sense of time

These eight components can clearly be grouped into two categories of four, even though Csikszentmihalyi does not structure it in such a way. There are four components that describe the effects of flow: engrossment, concentrating on a task, loss of self-consciousness and the altered sense of time. The remaining four characterize the pre-requisites for flow: clear goals, feedback, a challenge and being in complete control over a hectic situation (Salen & Zimmerman, 2003).

For anyone who has played a video game, there is something in the way flow works that will sound familiar. This is what keeps us coming back to play the same game, and games that are similar to it. It does not matter how long the flow state lasts, as long as it is achieved. However, the concept of flow is not something unique to games. The

subjects that Csikszentmihalyi used in his research of flow came from all walks of life: athletes, workers, musicians, artists, chess players and so on (Csikszentmihalyi, 1991; Johnson & Wiles, 2003). This means that flow is not so much about the actual task one is doing, but more about the person and their engagement in doing the task.

BEST PATH

When it comes to designing a game that will ensure its players will achieve this state of mind, the eight components of flow make it really hard to design for. However, by looking at the two groups devised by Salen and Zimmerman one can see that ultimately, the video game designer can only make sure that the game has the four pre-requisites for flow. By doing this, the designer will make sure that flow is at least attainable, so that if the game-player does achieve flow, that immersion can be achieved while playing the game. However, there are other aspects of flow that can be used when designing a video game. Since the flow state has to be experienced in such a way that the task the game-player has enough challenge to achieve the goal, balancing the gameplay becomes essential. The task cannot be too hard or too easy, or it will lead to anxiety or boredom.

To visualize this issue and try to come up with an answer, Csikszentmihalyi devised a chart to show the flow experience along two axes: one representing the increasing challenge of the activity and the other the increasing skills the user possesses (Falstein, 2004; Salen & Zimmerman, 2003). Between these axes lies what Falstein (2004, p. 52) citing Csikszentmihalyi refers to as "the flow channel", a channel where "the challenges and the player's skills increase at about the same rate".

Falstein's addition to the model of the flow channel is the "actual best" path (Figure 1). This refers to how game designers need to properly and accurately pace the gameplay aspects to achieve the actual best path in the flow channel. The "logical best" represents the theory that the logical best way is to keep increasing the difficulty/skill factor at a steady rate. This is true, but in a video game situation the best way to experience a game is when the pace of it takes you to high- and low-points. These points represent tasks or narrative structures that the game-player comes across that "mimics a natural rhythm common in other entertainment forms like songs, symphonies, plays, movies, and novels" (Falstein, 2004, p. 52). The game-player has to

walk this line, the 'actual best', which represented by point A in the curve is the period where the difficulty of a challenge increases dramatically, while point B shows the release of the tension or decrease in difficulty created by the challenge that has been faced and completed. In a game design situation, point A could be a 'boss battle' while point B could be a 'bonus level' (Falstein, 2004).
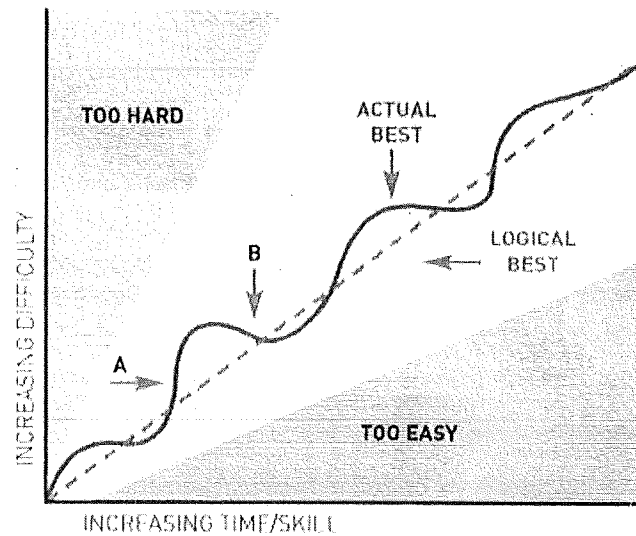
Figure 3. The Flow Channels, interpreted by Noah Falstein (2004, p. 52). Here we can see how the actual best path fluctuates between too hard and too easy.

There is a strong link between the feelings and experiences we have when playing video games, and the "flow" theory developed by Mihaly Csikszentmihalyi. Several, if not all of the components that Csikszentmihalyi identified, are present in most video games and the experiences one has when playing them. However, this does not mean that flow is the ultimate theory for creating positive video game experiences, not to mention an immersive experience. Since flow can be experienced by engaging in both passive and active activities, for work or for pleasure, it is not meant to be used as such in relation to games. Nevertheless, flow theory and the work that others have done with it in relation to games provides several guidelines that one can follow to ensure that the game-player will achieve as much flow experience as possible while playing the video game. The four pre-requisite components for a flow experience that Salen and Zimmerman identified, as well as the actual best path in the flow channel that Noah Falstein discusses, are great aids in understanding how to design a video game that provides maximum pleasure or an optimal experience to the game-player.

MOTIVATION

The most obvious link between Csikszentmihalyi's flow theory and the different motivational theories is the challenge factor that an activity has, which draws the user towards the successful completion of that activity. When looking at the most common motivational theories, challenge has been defined explicitly. Astleitner and Weisner (2004) looked at several motivational theories and developed a model for learning and motivation. Malone's and Lepper's four factors for instructional design; challenge, curiosity, control and fantasy (Astleitner & Weisner, 2004, p. 4), show that there are strong links between this motivational theory and Csikszentmihalyi's flow theory. Challenge and control are present in both theories: fantasy can be seen as flow creating engrossment in an activity that has the ability to provide control in a hectic situation, leading to the game-player becoming one with the machine.

Another strong motivational approach was developed by Randall Rezabek (1994). It uses John Keller's theory of motivation, consisting of effort, performance and consequences, and fused it with Csikszentmihalyi's flow theory. He explains how effort correlates to flow's aspect of challenge, performance is associated with the skill involved in completing a challenging activity, and consequences are the goals and feedback required to achieve flow (Rezabek, 1994).

Since the nature of motivational theory is heavily grounded in encouraging learning rather than in providing or enhancing entertainment, the use of this type of theory is limited in this research project because the main characteristics of the medium that is being looked at differ slightly. E-learning products or serious games are not being looked at, but video-games that provide entertainment experience. Still, the findings that will come from this research will be presented in such way that it can be used on learning products as well as entertainment products.

After understanding how flow and motivation can aid in creating immersive experiences, it is critical that we find the link between the theory and the medium. The strongest support for achieving flow and being motivated is the challenge factor that is important in both theories. If the game-player is properly, promptly and fairly

challenged, motivation will be generated, flow will be experienced and the game-player can be immersed. The aspect of video-games that seem to provide the best possibility for a challenging experience is in the form of gameplay, which will be looked at next.

GAMEPLAY

So what sort of gameplay creates immersion? This is impossible to pin down, because it depends on the type of video game that you are playing. However, the four pre-requisite components required to create flow (Salen & Zimmerman, 2003) can be used to look at the gameplay as individual tasks as well as holistic activity, and assure that the gameplay will provide as much possibility to create a flow state in the game-player. At any point in time one should be able to look at a particular game state and freeze it, so that one may check to see if the game-player has adequate goals to try and accomplish with his current skill set, as well as being given appropriate feedback on both the progress of the goal and how his control over the game mechanics are progressing. The goal the player is trying to accomplish should be a substantial challenge, but not outside of the game-players reach. And finally, the game-player needs to be able to feel in complete control of the situation, even though it might seem like a totally chaotic and hectic situation (Csikszentmihalyi, 1991).

Challenge is an aspect that exists in both flow theory and motivational theory. This strong connection can be linked to gameplay by looking at exactly what type of challenge a video-game provides. Ernest Adams and Andrew Rollings (2003) have looked at video-game challenge, and conclude that "pure challenges are the archetypal form of gameplay challenges", meaning that even though every different video-game seems to provide a different set of challenges than other games, it is possible to create a classification system that can be used to categories games more closely than what typical genre can.

OPENNESS

In the *Grand Theft Auto* (2001) game-series, the game-player has the option to pretty much do whatever they want. They can create their own goals, like engage in a high speed car chase with the police for no apparent reason before escape, or worse, get caught or die. He can also follow the main narrative structure, which in this case is a

type of non-linear narrative structure with "fold back" story elements. This means that the main plot and its elements can be played and accomplished in no particular order, but it will "eventually fold back to a single, inevitable event before" the game-player can continue with the main plot choosing the order of the story elements to undertake (Adams & Rollings, 2007, p. 215). At any time, the interface provides the game-player with feedback about where their character is in the game world in relation to the current chosen objective. Player status will show things such as health, armour, ammunition as well as the wanted level. When it comes to providing the game-player with control of a hectic situation, *Grand Theft Auto 3* (2001) can provide many situations like that, e.g. driving down the street at 200 kilometres per hour heading into a traffic-packed intersection while having the local police, the FBI, the SWAT-team and the military chasing you, waiting for you to make one mistake.

The way that gameplay has been designed in *Grand Theft Auto 3* (2001) matches perfectly with the game and its genre's style of play. Gameplay elements have been devised to allow one to cross-check them with the flow pre-requisites to test and evaluate if any given gameplay situation can create a state of flow for the game-player. In the case of *Grand Theft Auto 3* (2001), the narrative structure is very open in the sense that the game-player has complete control over what they want to do in the game world. However, to complete the game in a conventional manner, one must follow the narrative structure, and even though it is a non-linear structure, it will still converge to an important event that the game-player has to experience to progress within the story. Once the main storyline has been completed, one may have the option to keep on playing the game and do sub-plots, which add to the overall value of the game.

CHALLENGE DEFINITIONS

Earlier in this literary review, links were shown between Csikszentmihalyi's flow theory, motivational theories and the challenge that video-game's gameplay elements provides the game-player with, where strong, definite links. However, sometimes it can be very hard to understand exactly what type of challenge a video-game has. Understanding the true nature of gameplay challenges will allow for a deeper understanding in exactly what gameplay aspects allow for the creation of the flow state and ultimately video-game immersion.

An analysis conducted by Adams and Rollings into the pure challenges of video-games concluded that there are eleven archetypes of challenges (2003):

- *Logic and interface challenges* test information gathering skills and how well the game-player can interpret these to take the best course of action.
- *Lateral-thinking challenges* are extension of logic challenges in that the game-player has to use previous knowledge and use it in new ways to solve gameplay challenges. The difference is the application of knowledge, which can be intrinsic or extrinsic. Intrinsic refers to knowledge gained from the video-game applied to gameplay challenges (learning a magic spell and using it in different situations), while extrinsic refers to knowledge gained from the outside world applied to gameplay challenges (knowing that a boat will take you over water).
- *Memory challenges* simply test the game-player's memory.
- *Intelligence-based challenges* are not often used in games, but in IQ tests.
- *Knowledge-based challenges* are the ones that appear mostly in trivia-based games.
- *Pattern-recognition challenges* test our brain's core ability to recognise patterns.
- *Moral challenges* are high-level challenges that deal with the game-player's reason and moral character. One great example can be found in *Metal Gear Solid* (1998), where the game-player faces a difficult gameplay challenge: concede defeat to pain while being tortured, thus being responsible for the death of an important female character, or withstand the pain and save her.
- *Spatial-awareness challenges* test the game-player's ability to interpret the game world.
- *Coordination challenges* are present in almost every video-game, since they test the game-player's ability to perform several actions at once.
- *Reflex/reaction time challenges* test the game-player's reflexes and reaction time. Used mostly in conjunction with coordination challenges.
- *Physical challenges* involve the physical involvement of the game-player. A perfect example is *Guitar Hero* (2005), a video-game that uses physical challenge and coordination, reflex and reaction time challenges.

This list of challenges is very thorough and extensive, but does not lend itself that well to the purpose of this research project. Not only are there too many categories, some of them are very similar in nature or not even present in modern video-games. However, because several categories have similar properties, a more abstract list can be created to cover all challenge categories Adams and Rollings (2003) outlined that are commonly used in modern video-games. Thus, a definition list consisting of three categories can be generated:

- *Social-challenges* consist of moral challenges.
- *Psychomotor-challenges* consist of coordination, reflex/reaction and physical challenges.
- *Cognitive-challenges* consist of spatial, pattern, knowledge, memory, logic and lateral challenges.

This list can also be cross-checked with current video-game genres, to analyse and see that these genres also do not lend themselves to the approach this research project is taking. Also, one needs to be aware that a lot of games include challenges from these three categories, but that they always favour one of the three.

Challenge Clasification

Most common video-game genres can be defined into eight "core genres" (Oxland, 2004, p. 25): sports, adventure, action, simulation, strategy, puzzle, role-play and management. These terms give us some idea of the type of video-game style, and a clue on the type of challenges, but not the specific type of challenge and experience, the most important factor. That is why the three definition groups were devised, to provide a more general idea of what the particular experience a video-game can provide rather than what the type of video-game it is.

Social-challenge games include most role-playing games as well as several 'god' and 'software toy' games such as *The Sims* (2000). The fact that you can play these types of games in real-time as well as turn-based show the range of ways these games are designed. Psychomotor-challenge games include most first-person shooters, platform (action and adventure) games, but also abstract games such as music and dance games, sport games and driving games. This is a very broad group because of one fundamental thing: the most important driving force in these games is the interaction

between video-game and the video-game player. Last we have cognitive-challenge games which include most real-time strategy games, several 'god' games, as well as card and puzzle games such as solitaire and *Tetris* (1985).

The literature shows that trying to classify the challenge or experience video-games provide into categories is a very hard thing to do. The way the three definition groups have been set-up will allow for the framework to categorising both the challenge and experience the game-player has when interacting with a certain type of video-game. This structure will lend itself well to try and measure flow and other immersion aspects in video-game experiences. Whenever a game-player faces a gameplay challenge, depending on several aspects such as how well the feedback is designed and the game-player's skill, control over the situation can be achieved, which are several of the components of Csikszentmihalyi's (1991) flow theory.

To summarise the factors that are important to the generation of immersion from this cognitive point a view, a table has been included which recaps the factors, and the key points that are associated with these factors. These points have been discussed in the above two sections of this review.

Table 1

Cognitive Immersion Factors

Cognitive Factors	Key Points
Goals	Goals are important when providing the user with something worth while to accomplish (Flow & Motivational theories).
Player Skill	Players have to be able to test and develop their skills (Flow and Motivational theories).
Feedback	It is very important that the user knows exactly what the progress of his actions are at any given time (Flow and Motivational theories).
Challenge	The activity has to be a challenge to the user, but it cannot be too easy or too hard (Flow and Motivational theories).
Concentration	The user has to be able to focus on the task at hand (Flow and Motivational theories).
Control	The user has to feel that he is in control all the times (Flow and Motivational theories).

There are two strong psychological states that will be looked at and analysed: the way the game-player identifies them as while playing the video-game and the emotional connections the game-player experiences from interacting with different aspects of the video-game. Both these factors are by-products of interacting with a video-game, which play an integral part in creating emotional experiences that could lead to an immersive experience.

STATE OF MIND

Another influential factor when trying to identify immersion in video-games is the way that the game-player creates emotional connections with the activity and its narrative structure. This allows the game-player to start to identify with multiple aspects of the video-game, such as its characters, their experiences or the story setting. In *The origins of drama and the future of fun*, Howard Rheingold cites Aristotle's view on catharsis, a climactic emotional point of event in a storyline, and how it "was a healthy and necessary way for people to deal with the great themes of life and death" (Spiller, 2002, p. 140). To achieve this state, the process of mimesis is induced so that it will create an "emotional stimulation [enabling] humans to empathize with" the characters and the story they are trying to tell (Spiller, 2002, p. 140). In an interactive setting, Spiller argues that the only way catharsis and mimesis can be achieved is by further developing the 'artificial intelligence' (AI) of the product so as to create characters and a storyline that are believable to the video-game player.

AI is a programming area that is always in constant development, as faster hardware allows for running more complex code better. However, Spiller's argument about AI does not fit the framework of this project, but the ideas that we need to provide the audience, or game-player in this regards, with a climactic emotional point as well as empathetic situations are strong points to take onboard to try and see how they work in relations to creating an immersive experience.

Being able to design a video-game where the game-player will identify with the characters, setting and storyline is very much like trying to design for the achievement of flow. It is a very elusive state that we know has great impact on immersive experiences. Sherry Turkle talks about her research in *Constructions and reconstructions*

of the self in virtual reality and how RPGs and Multi User Dungeons (MUDs) are used by many people with personal issues or disabilities to be able to "find [themselves]...through another's persona" (Spiller, 2002, p. 212). By playing an RPG, a participant was able to re-live a painful experience and try to understand it by 'working through' it. Another contestant with strong disabilities lived a fulfilling life online playing a MUD over 40 hours a week (Spiller, 2002). These cases, though extreme, provide valuable information in regards to entering the 'suspension of disbelief' realm, or in other words, having an immersive video-game experience.

EMOTIONAL ATTACHMENT

Being able to design a video-game that will evoke emotional responses from the game-player is one of the hardest things to do in the field of game design (Freeman, 2003; Sheldon, 2004). There are different approaches to trying to achieve this elusive goal, such as three-dimensional character development to movie and television techniques (Sheldon, 2004). Some go so far as saying that there is no fixed way of achieving emotional connections in video-games, and that the only way to design for emotions is from using one's own emotional experience to draw inspiration on how to re-create them in a video-game situation, much like actors re-create past experiences when they need to express a certain emotion (Sheldon, 2004). This approach is too unreliable, but there are some valuable points when it comes to creating an emotional connection that will create an immersive experience. Trying to re-create these personal feelings in the game-player allows for greater identification with the game and its characters, thus enhancing the chance of immersion.

Another way of achieving stronger emotional connections with a video-game is to 'emotioneer' a video-game with a design structure created by David Freeman that specialises in creating emotional response and connections in a video game in such a way that the user will become more immersed in the whole game experience. 'Emotioneering' is the "body of techniques created ... [to achieve] ... a breadth and depth of emotions in a game or other interactive experience" (Freeman, 2003, p. 7). Much of Freeman's experience comes from writing in the film and television industry, as well as writing and designing video-games. He states that there are two primary means of evoking emotions in game-players (Freeman, 2003):

- Create characters that the audience will identify themselves with.

- Have the characters go through a series of affecting experiences.

This sounds simple enough, but Freeman has devised over 30 categories of emotioneering techniques to aid in the development of emotions in video-game situations. For the most part, they cover all aspects of a narrative structure and play "interesting" and "deepening" techniques (Freeman, 2003). Interesting techniques can be applied to the story, characters, etc, to make them more dimensional or interesting. Deepening techniques can be used on the same elements, but they are used to give these elements more "emotional depth and complexity" (Freeman, 2003, p. 61), such as an important character hiding a secret important to the storyline of the video-game.

After understanding how personal identity and emotional experiences play a part in creating strong emotional connections between the user and the video-game and the experience, one can see that these factors play a big role in creating immersion. The aspect of video-games that seem to provide the best possibility for an emotional experience is in the form of narrative elements, which will be looked at next.

NARRATIVE

There are many myths and misconceptions about the place of narrative, or storytelling, in video games. The most common debate is whether or not games should have narrative elements, and if so, how these stories should be structured and told to the game-player. In one of his lectures, Ernest Adams (2004) talks about some philosophical issues that underpin game design and how they inherently limit the way one manages to tell a story to create immersion. He mentions how game developers nowadays are constantly trying to create a 'romantic' product using 'classical' means, or trying "to write technical documents which enable the creation of romantic fantasies". The main point is that the reason why games struggle so much to be as immersive as other media (such as books or movies) is because of the limited narrative form and structure that is so often used in game design.

A different view is that the inherent interactivity that games possess and the way that games try to give the game-player the freedom to do as they please, limits the level of complexity of the video game narrative. Some game designers believe that "we

shouldn't attempt to tell more than cursory stories in games" (Sheldon, 2004, p. 8). However, Sheldon strongly believes that video games need narrative elements and explains how "games that encourage active participation in storytelling are as old as games themselves. Children ... act out stories, play characters, and mould their stories and characters in reaction to their friends' actions" (Sheldon, 2004, p. 9). This means that we are all familiar with and have enjoyed such interactive narrative, so that when one looks at games it is obvious that even the most abstract puzzle or music video game is trying to convey some sort of information to the game-player, be it parts of the narrative story or some feedback on the progress of the current undertaken activity (Adams, 2004; Adams & Rollings, 2007; Sheldon, 2004).

Game design has adopted several narrative structures from traditional media such as fiction books and movies. There are many different types of narrative structures in use: some follow the Aristotelian three-act structure (Fairclough, 2004; Sheldon, 2004), "the hero's journey" structure initially conceived by Joseph Campbell (1973) and several types of non-linear storytelling techniques (Adams & Rollings, 2007). The most common type is based on the writings of Aristotle, a Greek philosopher and writer, which was one of the first to critically look at and evaluate narrative structures. He concluded that any form of narrative needs to have a single cause which drives the story, and that this cause needs to be expressed by having "a beginning, middle, and an end section. It will thus resemble a living organism in all its unity, and produce the pleasure proper to it" (Aristotle, 1997, p. 47). What this means is that stories that follow this type of structure are familiar to us because they remind us of life individually. Just as we are born, mature, and eventually die, stories with such structure are accepted because the framework is the same, but the content is different.

EVERYDAY HERO

Just as the Aristotelian three-act structure mimics individual life, so does the hero's journey. The original idea was analysed and explained by Joseph Campbell in his seminal work *the hero with a thousand faces* (Campbell, 1973). Campbell is primarily interested in the mythologies of the world, and how they all relate to each-other in such a way that they all consist of an archetypal hero character, hence the name of the book. He begins by introducing the term 'monomyth', a narrative structure based on three acts which consist of a total of 17 sub-scenes. In the same way that Aristotle

divided his narrative structure into three parts; the monomyth uses departure, initiation and return. There are several sub-scenes to each act, and not all of them are necessary to create a hero's journey.

In short, the hero and his world are introduced and he receives the call to adventure that he initially does not want to pursue. The hero meets a wise old man that helps him across the first threshold, where he faces many challenges and meets characters. He reaches the inner lair and faces the final challenge, which he surpasses and this act resurrects him into a new being, enlightened by his experience, with the elixir to bring back to his world (Bates, 2004; Rice, 2006). In essence, the "hero's journey is a trip that a central character goes on in order to resolve a problem" (Dunniway, 2000, p. 2). Just as the three-act structure mimics how our lives progress, the hero's journey can be seen as a metaphor for our lives as a whole, as well as any challenge that we face every day. These aspects make this sort of narrative structure very compelling, and this is why they are used when designing the narrative structure of games.

However, many video-games designers rely too much on the monomyth, almost to the point of becoming a novelty when trying to design a narrative for their video-games. Almost every action, adventure and role playing game (RPG) created uses a variation of the monomyth, but only a handful of these become top selling games. Games such as *Myst* (1993) and *Pokémon Red and Blue* (1996) series use the monomyth to provide the narrative structure, but use several sweetening and deepening techniques that can be seen as emotioneering (Freeman, 2003). *Pokemon Red and Blue* (1996) is also one of the highest sold video-games in history with over 30 million shipped units, surpassed only by *Super Mario Bros* (1985) with 40 million shipped units (VG charts, 2006).

STORIES IN GAMES

There are several reasons that come into play when considering whether or not to include a narrative structure in a game. Ernest Adams and Andrew Rollings (2007, p. 185) have identified several reasons why narrative elements are important. From an entertainment point of view, narrative elements can be of great value to the overall experience that games provide. Adams and Rollings state that "without a story, a game reduces to a contest: exciting but artificial." This is true, not only in regards to video games, but to several aspects of our life as well. As exciting as it is to watch any type of

organised sport, if you have followed a particular team for the whole season or throughout a tournament, then the road they travel and challenges they face to get there is a narrative that you as the viewer create that allows you to appreciate the game on several levels. As Adams and Rollings (2004, p. 185) state, "a story provides greater emotional satisfaction by providing a sense of progress towards a dramatically meaningful goal, rather than an artificial one". This factor also plays a part in aiding the game-player to stay interested in long games. A gripping story will provide the variety needed in long games as they can become repetitive and dull.

From a business point of view, a story will catch the attention of a larger audience, which again will allow the game to generate sales. Many game-players will only buy games with a substantial story. RPGs such as *Final Fantasy X* (2001) and Adventure games such as *The Legend of Zelda - Ocarina of Time* (1998) have both sold over five million copies worldwide (VG charts, 2006). Players are also able to disregard narrative elements by skipping past them (almost in all cases, some designers actually disregard this 'rule'), and features such as cut-scenes, in-game dialogues and written material are almost never relevant to the gameplay aspects of a game, nor should they be. One of the reasons *Grand Theft Auto 3* (2001) was so successful is because the player has the option to play the narrative part of the game, or just 'roam around' and play the game as they wish. This makes games with a narrative with the option to bypass them very compelling to several types of game-players, which makes them an easier product to market and distribute (Adams & Rollings, 2007).

TELLING THE STORY

The most important aspect of narrative in video games is not so much the structure or the story itself, but the way that it is delivered to the game-player. This plays a much larger role in creating flow and emotional connections. The tools and techniques that are used very, and they are influenced by more traditional media, such as movies and novels. The most common way of telling parts of a story to the game-player is by using cut-scenes. These come in two variations: pre-rendered and in-game cut-scenes (Bates, 2004). The main difference between the two is the visual quality. Pre-rendered scenes look much better than in-game scenes, since they have been created by powerful computers for the purpose of telling the story visually. However, pre-rendered cut-scenes tend to work more as a 'treat' to the game-player for progressing up to that

point, as well as reminding the game-player that still, it is just a game (Oxland, 2004). Still, pre-rendered cut-scenes are the closest a video game will get to a movie in the sense of creating immersion. That is why they should still be used, but sparingly. In that sense, in-game cut-scenes are preferred because quality-wise, they look identical to the way the game world looks. This aids in merging gameplay elements seamlessly with narrative elements so that the game-player can get into the life of the game.

Another way of telling the story is by using the game's non-playing characters (NPC). Even having a great story is not enough, because the essential element in a narrative is the actions that drive it forward, and these come from the conflicts that the different characters create (Sheldon, 2004). However, what type of characters the game-player uses, as well as the types of NPCs that inhabit the game world depend on each individual game, and thus vary from game to game. What is important is the way in which they deliver the story. This can come from dialogue as well as written content. Both these types have their strengths and weaknesses: dialogue needs to be appropriate and fluid to seem realistic, and the game-player does not really want to sit and read narrative elements presented in video-games, even though they provide a lot of information as well as helping and supporting the gameplay aspect of learning through discovery. Nonetheless, neither cut-scenes, dialogue nor written forms should be used without cause or reason, they "should have specific goals, whether it is to develop character, introduce a new environment, advance the plot, or set out mission goals for the section to come" (Sheldon, 2004, p. 103). By doing so, the narrative elements used in a video game will create a strong foundation for immersiveness because they draw upon the way other mediums have done in the past to create immersion.

When it comes to narratives, the hero's journey and the three-act structure are neither right nor wrong. The important thing to realize is that there is no true structure, and neither should there be one. A structure has to be devised, not only to fit the story, but more importantly, to fit with the way the video game provides this information to the game-player. This is crucial because the structure may only provide familiarity and comfort. If the narrative structure is too rigid, the game-player will feel as if they are just along for a ride. If it is too loose, the game-player will lose interest. Nevertheless,

the general consensus seems to be that "not every game out there needs a strong story, but many do. Not every game out there has a great story, but many should" (Dunniway, 2000, p. 1).

To summarise the factors that are important to the generation of immersion from this affective point a view, a table has been included which recaps the factors, and the key points that are associated with these factors. These points have been discussed in the last two sections of this literature review.

Table 2

Affective Immersion Factors

Affective Factors	Key Points
Aesthetics	The look and feel has to be appropriate and believable to the player.
Narrative	The plot, setting and characters involved have to appear credible and believable to the player.
Identity/Self-consciousness	The user stops thinking about everyday life and thinks only of the activity, as well as becoming emotionally attached to the activity.

CONCLUSION

One of the most elusive terms in the entertainment industry is 'immersion'. When it comes to video games, immersion is an area that is extremely hard to design for. By looking at different theories, as well as design principles, this literature review has come to the conclusion that it is important to pay due attention to the narrative structure and elements needed to appropriately convey the story to the game-player. The same goes for the gameplay aspects of the video game. Both these facets need to be adjusted and evaluated to make sure that they are appropriate for the game as a whole. When produced effectively, narrative will lead to the creation of identity and emotional connections, and gameplay will lead to the creation of flow, which ultimately leads the game-player into immersion in the video game activity.

To visualize this framework, a figure showing a model of immersion has been devised to display the division between the cognitive and affective aspects (Figure 2). The most important factor is how immersion can be divided into two "zones", cognitive and

affective, and how the different factors get "funnelled" downwards as to create an immersive experience. The video-games create the link between the theory of immersion and the mind-state of immersion.

	Cognitive Zone	Affective Zone
THEORY	• Motivation theory • Flow theory • Gameplay	• Identity • Narrative • Aesthetics
GAME	• Goals • Feedback • Skill • Challenge • Concentration • Control	• Visuals • Story • Setting • Characters
MIND STATE	• Engrossment • Altered sense of time • Flow state	• Willing Suspension of Disbelief • Loss of Identity • Identify with game
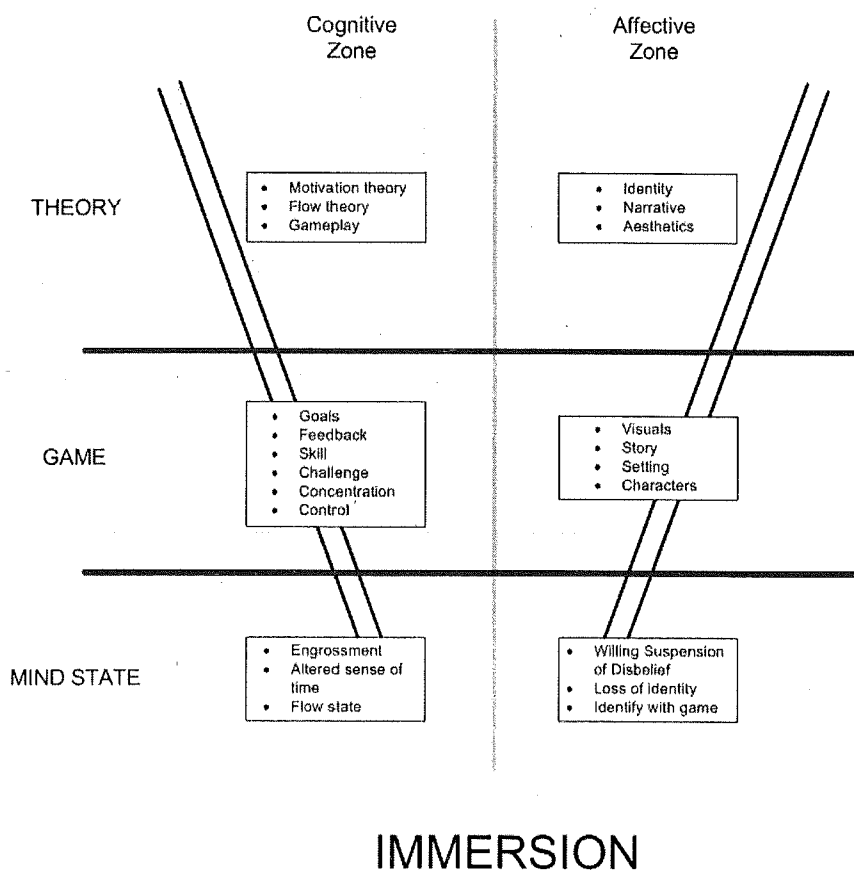
IMMERSION

Figure 2. A Model of Immersion. The model is divided into two zones, cognitive and affective, and show how video-games, with help from other established theories, can create an immersive experience in the user.

One can see that the foundations of immersions are based on two main factors: the way the game-player thinks and feels while playing the video-game. Another way of looking at this is how video-games create cognitive and affective experiences. When asserted with Csikszentmihalyi's flow theory, we can see that flow can be divided in two categories: the pre-requisites for a flow experience and the effects of flow on the game-player. These are identical to the cognitive and affective experience, or how the player think and feels about the video-game experience.

This dualism that seems inherent to achieving video-game immersion has not been researched, which is where the significance of this project comes into play. By

identifying the factors for video-games' 'immersive property', we can create a taxonomy that will allow us to reproduce it accurately and more effectively when designing video-games. This will answer the second research question of the project, *how can an understanding of these factors help guide video-game design?*

METHODOLOGY

This research project used a broad phenomenological theory in that it "describes the meaning of the lived experiences for several individuals about a concept or the phenomenon" (Creswell, 1998, p. 51), in this case the concept of immersion in video-games. The data was gathered by drawing information about a variety of video-game players, a set of games specifically chosen for this project, and how the players perceive and experience these video-games. The exploration of this concept was two folded: a longitudinal exploration of the game-player's playing experience, a critical analysis of the selected games and the extent to which the embedded criteria for immersion affected their experience. To be able to collect the research data, two tools were chosen and developed, which meant that two different groups of participants were needed. The first group consisted of expert game-players that would play a specific game and write an online journal entry after each game-session. The second group had to answer a questionnaire after playing a particular game for 15 minutes.

TOOLS & PARTICIPANTS

The reason for using these particular tools was because of their effectiveness at displaying experiences and ideas from the participant's point of view, particularly in a phenomenological study. This methodology has been designed to extract what the video-game player feels and perceives the game experience to be, ranging from interactivity, narrative and emotional experiences while playing the game. The questionnaire group will allow for a broad look at what the immersive factors might be by providing summarized data, while the online journal group will allow for a much deeper look at the same factors across time (Lester, 1999).

The data these methodologies provide will help in answering the first research question, *what aspects of games make them immersive*. The validity of the data will be triangulated with each-other, as the data from one group will show immediate feedback about the video-game experience, while the data from the other group will show the same trends but over time. Once the research data is analysed and crosschecked with the immersion model and game analysis, the second research question, *how can an understanding of these factors help guide video-game design*, can be looked at. With this information providing an overview of the important criteria of

immersion, as well as why they are important, a conclusion about the matter can be made.

Several video-games were made available to the participants. These were chosen based upon the three game-challenge definition groups specified in the literature review: *Psychomotor-challenge* games (coordination, reflex, reaction and physical challenges), *social-challenge games* (moral challenges), and *cognitive-challenge games* (spatial, pattern, knowledge, memory, logical and lateral challenges). It should be noted that games can have a tendency to use a mix of all three challenge types, but all games have a predominant disposition towards one of them. The games in these definition groups were available on different platforms: PC, Macintosh, different consoles and handheld devices. These games will be introduced and analysed in their respective section.

QUESTIONNAIRE GROUP

The questionnaire group consisted of volunteer students in the unit *GDT3103: Serious Games*, running at Edith Cowan University (ECU) The purpose of this group was to explore the specific criteria identified as important within each of the game types in a manner that would allow general understandings about how the games worked in terms of immersion across a range of users. Questionnaires provide this broad kind of summarized data in order to establish certain trends that were then analysed and triangulated with the data from the online journal participants' entries. They also provided demographic information about the group such as age, gender and level of video-game experience to see what extent these factors mediated the immersive experience. The approach to administering the questionnaire was that the students had to play a video-game for 15 minutes and then answer the questionnaire about their experience playing the game. This was done three times, once for each game.

The content of the questionnaire was designed using the factors established by the literature and displayed within the immersion model (Figure.2), thinking in particular about the cognitive (Table.1) and affective factors (Table.2) that form the foundation of the model. In short, the factors were: goals, challenge, player skill, feedback, concentration, control, aesthetics, narrative, self-consciousness and level of immersion. It was important that each factor was explored well enough to provide sufficient data about it, so a minimum of four questions per factor was set. Each question would be as

unambiguous as possible, only referring to one aspect of the factor in question. Below is a bulleted list of the factors and which of the questions tried to explore that particular factor.

- Questions 1 to 27 covered all the cognitive factors.
    - Questions 1 to 4 covered the cognitive factor of goals.
    - Questions 5 to 9 covered the cognitive factor of challenge.
    - Questions 10 to 14 covered the cognitive factor of player skill.
    - Questions 15 to 18 covered the cognitive factor of feedback.
    - Questions 19 to 23 covered the cognitive factor of concentration.
    - Questions 24 to 27 covered the cognitive factor of control.
- Questions 28 to 43 covered all the affective factors.
    - Questions 28 to 33 covered the affective factor of aesthetics.
    - Questions 34 to 37 covered the affective factor of narrative.
    - Questions 38 to 43 covered the affective factor of identity.
- Questions 44 to 58 covered the level of immersion.

Each of the factors were represented in the questionnaire by a set of questions that tried to measure the user experience with a negative-to-positive Likert scaling system, using an odd-numbered scale from 0 to 10 labelled strongly disagree (0) to strongly agree (10) and an extra option of N.A. (not applicable) to provide the measurement. Likert scales measures the participant level of agreement with a particular statement in a one-dimensional way, each question measures one of the outlined concepts (Trochim, 2006). Using an odd-numbered scale allows the user to agree and disagree, but also remain neutral about the statement. All of this will aid in creating the foundation for understanding the more complex, multi-dimensional concept of video-game immersion.

The writing of the questions was done over the course of several iterations. After the first iteration, the questionnaire was analysed by the supervisor and with that feedback a new iteration was made. This version was then analysed by the questionnaire participants and they provided additional feedback, producing the last iteration of the questionnaire. Once the third and final version of the questionnaire was completed, it was given to the participants after they had played a particular game for 15 minutes.

The questionnaire was the same for all games in order to get reliable data that will be generally applicable to establish trends that video-game users experience regardless of the specific video-game. A copy of the questionnaire has been included as well (Appendix E). Below is a description of each game that was administered to the questionnaire group.

The games selected for this part of the project were carefully chosen to match one of the three game challenge definition groups: Psychomotor-challenge, social-challenge, and cognitive-challenge. The purpose was to ensure that a range of games that represented the broad genres of gameplay was represented. To provide a basis for the analysis of the ways in which the games support immersion as defined within the immersion model (Figure.2), a brief analysis of the salient features of each game follows.

LEGO Star Wars (Mac Demo) – Psychomotor Challenge

Lego Star Wars provides psychomotor challenges within the genre of a 3 dimensional platform game. It provides the user with a large amount of coordination, reflex, reaction and physical challenges as the user solves puzzles and defeats enemies within the context of the narrative defined within the Star Wars series of films. Therefore, game is set in the familiar Star Wars universe, but with characters and environments made out of LEGO plastic toys, seen on the right image of Figure 3. The user can play through scenes of the movies from the second Star Wars trilogy: The Phantom Menace, Attack of the Clones, and Revenge of the Sith, while controlling famous characters such as Obi-wan Kenobi, 3-CPO and Yoda.
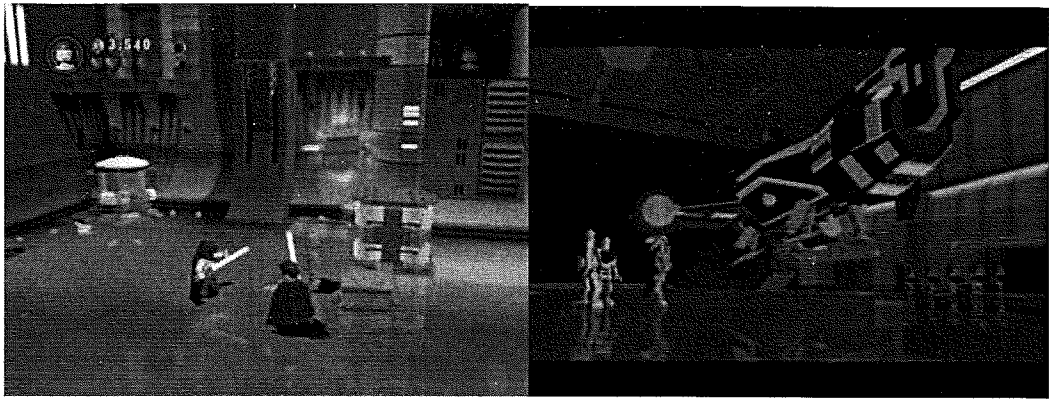
Figure 3. LEGO Star Wars Screenshots. To the left we see the player 'using the force' to lift a LEGO crate on top of another to be able to get to a hard-to-reach place. To the right we can see a 'cut-scene' where we can see Star Wars battle droids and a spaceship made out of LEGO, landing in a space hangar.

Using well known brand names as LEGO and Star Wars, one can claim that both fans and casual gamers can connect with the game on different levels because of these familiar aspects. For instance, using "the force" is one aspects of the game that relates strongly to the immersive criteria of presenting a believable, consistent world with multiple challenges, that the player can control at all times, as defined within the immersion model. The player can solve puzzles and collect hidden items by manipulating the LEGO environment around you with this power, allowing the player to use his curiosity and explore the game environment. The left image of Figure 3 shows the player lifting a LEGO crate on top of another to get to a hard to reach place.

The implementation of the game within the study was constrained by a number of factors. First, it is a demo of a full game. This can shorten the time the user will have playing the game. However, this can also force the player to think about their feelings in regards to wanting to keep playing it or not. Secondly, being on the Macintosh platform can have an impact on the performance of the game, thus altering the perception of the user of how the game is supposed to look and play. This is because of the hardware differences between the platforms, as well as optimization for console platforms. Last, other factors that can come into play are if the user is already familiar with the game or has played through it, or if the user is not comfortable using a keyboard control scheme.

Sid Meyer's Civilization IV (Mac Demo) – Cognitive Challenge

Civilization IV has a focus on strategy as the primary mediator of gameplay. In this sense it can be defined as providing cognitive challenges. It tests the players' logical and lateral thinking abilities, as well as providing spatial, memory and knowledge challenges. The user has to take control of the development of one of many civilizations: ranging from East to West Chinese to Aztec Empires, and take them from the Stone Age through to the Space Age and beyond. There are several technologies and religions that have to be researched and developed through the course of the game for the player to be able to finish the game. There are also multiple "victory conditions"; you can eliminate all opponents or establish the United Nations to win the game, which provides flexibility in goal definition.
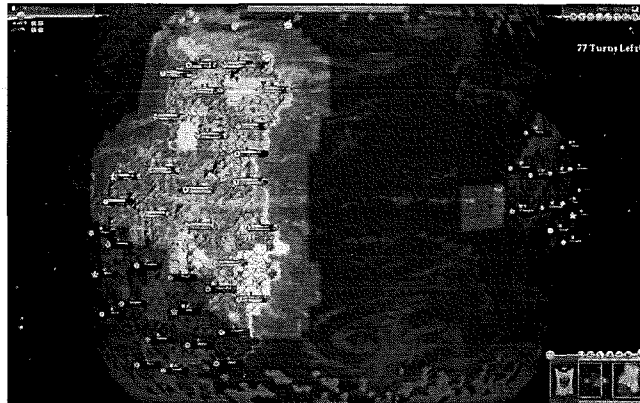
Figure 4. Sid Meyer's Civilization IV Screenshot. The whole '3D globe" that is available to the player once he has 'discovered' the whole planet. Notice all the interface buttons located to the top-left, top-right and bottom-right area of the screen. These lead the player to different organization menus of the game, such as research and city development.

Being the fourth instantiation of the Civilization series, this game is specially made for fans of the game as well as of the genre. By upgrading the visuals from a flat 2D "map" to a scalable 3D "globe" (Figure 4), the game is trying to catch the attention of unfamiliar users as well. The setting aids to this as well, as the whole content of civilizations, technologies, religions, etc, are taken from our human history and current developments. The game does not rely on rapid response from the player. It is a turn-based game where the user can take as much time as needed to complete each dedicated turn, emphasizing the cognitive and strategic aspects of gameplay in a similar manner to games such as chess.

There is a significant limitation in the implementation of this study relating to the complexity of the game. Being a turn-based-game forces the player to stop and think about what's going on. Depending on how much time the player can spend playing the game, the experience can be limited by not being able to fully appreciate what is really happening on the screen. Because of these factors, the game has a very steep learning curve, which will likely have had an impact on the immersion the player would have felt in the brief exposure experienced within the study.

Unreal Tournament 2004 (Mac) – Social Challenge

Unreal Tournament 2004 is all about kill-or-be-killed. The game is based on matches that are either time or point based, played on a set amount of maps/levels, where the player competes either as an individual or as part of a team against opponents for the match victory. The game is a typical "first person shooter" (FPS), where you see through the game entities eyes or point-of-view (Figure 5). The game has a futuristic setting and with an unbelievable weaponry, which guarantees to create a hectic, tense and action packed experience for everyone involved. Since this game has such basic premises, it has been chosen as the social-challenge game, because the player is basically doing moral and social choices within the game based upon the responses of other players in a blend of collaborative and competitive activities.

Figure 5. Unreal Tournament 2004 Screenshot. This is the point-of-view of the game, as well as information about the current game session such as team scores, who the ball carrier is, as well as current health status, available weaponry and ammunition.

Being a FPS, it is catered directly for that audience. The game also uses psychomotor- and cognitive-challenges, testing the player's coordination, reflex, reaction, special awareness and memory. However, it is predominantly a big social-challenge, in that

the player chooses to plays exactly the way he or she feels like playing. On top of that, you have the team element, which enhances the social aspect by allowing teams to develop tactics and create a dynamic within the team.

The main limitation lies within the gameplay itself. Becoming accustomed to controlling such games takes time and you can get overwhelmed by the complexity of it. Adding real human players against you, who can be more familiar with the game and its genre, and then the balance of challenge and skill inherent in flow becomes mediated by the skills of the other players rather than controlled within the design of the game. Its team-based nature however, means that as long as you are a team-player, your individual skill can be compensated by the team, even though the weakest link can also break the team.

Online Journal Group

The online journal group was intended to consist of six participants who played three games individually, with a view to providing a male and female "expert gamer" perspective for each video-game. This was done to try and match the three game challenge categories: Psychomotor-, social- and cognitive-challenge. The subjects were chosen depending on their age, gender and preferable gaming platform to try and mimic the usual demographic of video-game players. The subjects were to play a single video-game each for a period of no more than six weeks. After each gaming session, the participants wrote a journal entry about the game experience. Unfortunately, of the seven initial participants that signed up, only three were able to actually contribute to the online journal. This limited the amount of data available and its overall contribution to the research project. Nevertheless for this limited number of participants a deeper level of data was able to be gathered that captured the more authentic and longitudinal experience of playing a game over a period of time to triangulate the broader but more shallow data gathered from the questionnaire group.

The participants were given a structure to follow to aid in the writing of the entries, in order to make sure that what they wrote was relevant to the study. The entries were divided into three different types: first-impression, game-progress and post-mortem. After playing the game for the first time, the participant wrote a first-impression entry about the experience. Every time after playing the game, the participant wrote a game-

progress entry, and after finishing the game or if the allowed period was over, a post-mortem entry was written. The first two entries were identical in scope; both entries covered the same topics. These are game goals, feedback, challenge, concentration, gameplay and narrative. The only difference is that the game-progress covers changes from the previous game session. They also had to finish up by measuring the length of the session, writing any additional comments, and give the game session a score (out of 10). The post-mortem would be written at the end and would cover as a whole, what was good and bad with the game, as well as a final score for the game (also out of 10). When writing the entries, participants were told to not only outline what was happening in the game in view of the factors, but what they though and felt about them. Table 3 show a summary of these factors.

Table 3

Online Journal Structure

First-Impression	Game-Progress	Post-Mortem
Game goals (in the game as well as created by player)	Game goals (progress and additions)	What went Right (what was good about the game and why)
Feedback (what form and how effective it is)	Feedback (progress and additions)	What went Wrong (what was bad about the game and why)
Challenge & Concentration (level of challenge, concentration)	Challenge & Concentration (how/if this has changed)	Final Rating (of the game, out of 10)
Gameplay (how does one play the game, examples)	Gameplay (progress and additions)	
Narrative (what form and how effective it is)	Narrative (new developments)	
Session Length (how long you played) Comments & Rating.	Session Length & Rating (same as before)	

The topics the first-impression and game-progress entries had to cover were part of the theoretical framework and immersion model (Figure.2) and would therefore cover cognitive and affective properties that are important in the generation of immersion. Participants had to explain what goals were inherent in the context of the game as well as any that the player created for themselves, such as uncovering hidden items not necessary to finish the game. The level of challenge provided by the game is an important immersive factor so respondents were required to comment on whether the game was too easy or too hard to play. The specifics of the gameplay had to be explained, as well as how much the player had to concentrate while playing. The feedback, or how the game communicated information to the player, was also important to uncover, as these provide the mechanism to gauge performance and guide the choices the gamer would make. The narrative aspects such as the story, characters and game world had to be introduced and explain in terms of believability and context.

As an aid to completing the activity, the participants received a sample of these entries for a different game, one that none of them wanted or thought of playing. These samples entries covered all three entry types, giving the participants a model response for how to structure their online journal entries, what to cover but most importantly how to cover it. Not only did the participant need to describe the ins and outs of the particular game, they had to talk about how it affected them, on a cognitive as well as on an affective level.

ONLINE JOURNAL GAMES

The games chosen for the online journal were selected in a different manner to the questionnaire games. The participants in this group were selected because of their extensive experience playing video-games. They chose the game they wanted to play themselves because they had a strong taste in particular games, an aspect that was important to include because it enabled individuals' predispositions to be considered in light of the exploration of the immersion model (Figure.2). As a first step to exploring the online journal these games were also evaluated to see how they fitted against the three game-challenge categories. A brief analysis of the prominent immersion features of the games follows, which will provide a baseline for the analysis of the online journal entries.

Sid Meyer's Pirates! (PC) – Cognitive Challenge

The setting of this game is the 17th century, where you play the role of a pirate trying to avenge your family while exploring, fighting and sailing around the Caribbean. This game provides the user with predominately cognitive-challenges in the form of strategy, as well as testing the players' memory, logical and lateral thinking abilities. However, the game mixes in psychomotor- and social-challenges in the gameplay as well, in the form of mini-games: a scenario-based challenge with few goals and simple controls.
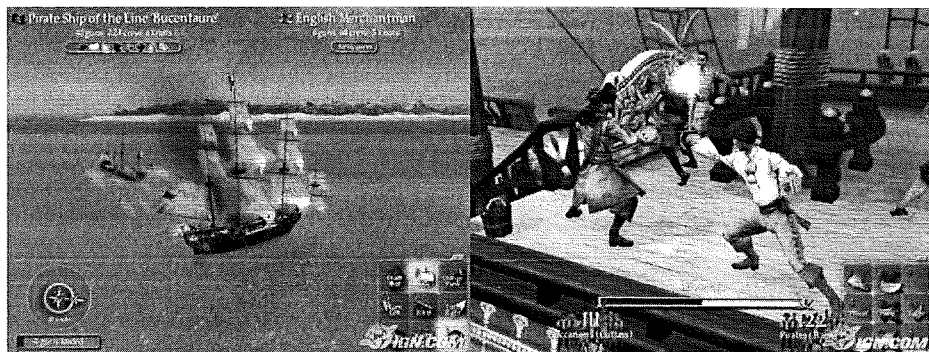
Figure 6. Cid Meyer's Pirates! Screenshots (IGN Entertainment, 2007). The images shows a sea-battle between the player and an English merchant ship (left), and the sword duel that the player has to win to be able to plunder the ship's goods (right).

To provide the player with challenges from the game categories, the game's gameplay consist of multiple mini-games. These include sea-battles, sword duels, looking for treasures, dancing and sneaking, examples of which can be found in Figure 6. Sword duels and dancing are pure psychomotor-challenges where you have to time different moves against events and cues on screen. When not involved in these mini-games, the player controls the ship and crew from port to port and hires more crew and upgrades the ship and equipment. This is essential to be able to experience and unfold the main storyline of the game. However, this is not a requirement to complete the game, as this happens automatically when the player's character reaches a certain age. The player is then able to create a new character, and start the whole journey over again. This extends the longevity of the game, but also set a social-challenge to the player in that it's a very open game and the player plays it the way they want: be ruthless and dominate the sea, be an explorer and look for treasure or see how many Governors daughter's you can charm. This allows the player to create their own goals, have control of the game, and get emotionally involved with the game.

One of the defining features of this game is the openness and vastness of the world. This provides affordances as well as limitations. The player might feel overwhelmed, and without a strong storytelling aspect guiding the player where to go next, might lead the player to feel bored. As identified earlier, feeling bored is a major "game-breaker", a particular feature or aspect about the game and/or the experience that can eliminate any opportunity of generating immersion. However, as long as the player is aware of this, the element of exploring can be introduced and the player might eventually feel more emotionally connected to the game. This ultimately provides the player with a high level of control, which is a definite "game-maker", an aspect that has the possibility of providing immersion. The lack of well defined and structured goals and requirements also provides the player for a more self-constructed narrative rather than a predicable one that has been laid out in advance. Another limitation might be the credibility of the game, in that it glorifies piracy by displaying them as a gang of happy rouge sailors, drinking and singing songs while sailing the open sea. They also don't talk, but babble some gibberish instead, which is consistent with the theme, but might also limit the extent to which the user identifies with these characters, in that they all become the same, a glorified stereotypical view of what pirates are.

Lunar Knights (Nintendo DS) – Psychomotor Challenge

Lunar Knights is an action-adventure platform game, which basically provide psychomotor challenges. The game is set to be a Gothic, science-fiction world, where you control two different characters on a quest to save the world from a horde of vampires. The control scheme is very simplistic, which facilitates concentration and control of the game. The story, setting and characters seem credible and the world as a whole very believable. Using the Nintendo DS as its platform allowed the game to be displayed on two screens, dividing the interface across its top and bottom screens (Figure 7).
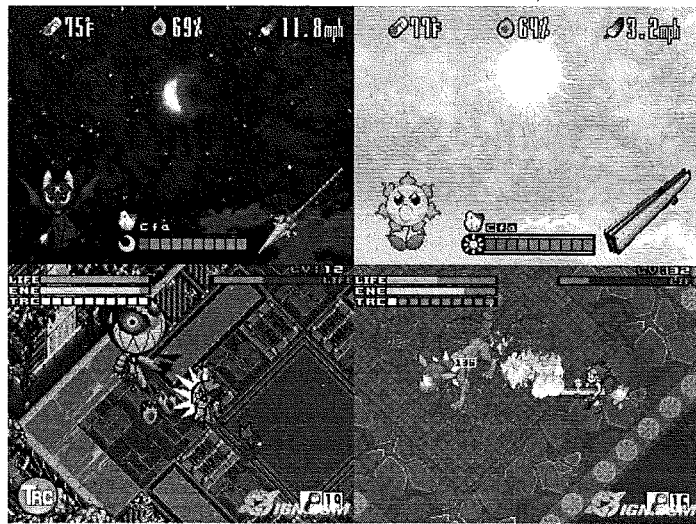
Figure 7. Lunar Knights Screenshots (IGN Entertainment, 2007). The top screen shows the change in light condition (left image shows night-time and right image show day-time) which forces the player to change to different weapons to handle these conditions.

The game provides the player with a mix of challenges and goals to accomplish, which are basic psychomotor challenges that target the player's coordination, reflex and reaction skills. One of the most challenging aspects is how reliant the player is on the game's solar/lunar cycle. To be able to use their weapons, players have to constantly charge them with light energy from the sun or moon, as demonstrated by the screenshots in Figure 7. This creates an intricate challenge where the gameplay can change drastically depending on their energy levels. There are some role-playing aspects to the game as well, such as part of the game-world being a hub-city where you can do trading, upgrade weapons and equipment and talk with other characters to learn more about the world's history. This puts the player in a consistent world where the player has ways of becoming emotionally attached with the game as a whole. This is not the main focus of what the game provides the user with in terms of challenge, because most of the time will be spent in the dungeons battling the enemies, which ultimately stimulates the user from a psychomotor point of view, which again supports the theoretical framework in terms of generating flow, an important aspect of creating immersion from a cognitive perspective.

The only limiting aspect is comes down to the player's skill. If it is not high enough, the player will run into problems quickly. It takes skill to manage the light-energy efficiently. Also, the only time you use the stylus, a pen used to touch one of the

Nintendo DS's screens, is when you are going to take down a stage boss, and if the player is not accustomed to this control device, it can make the game excessively challenging. All of these factors may disrupt the player concentration and flow state, and will eventually break any sense of immersion in the game.

Samurai Warriors: State of War (Sony PSP) – Psychomotor Challenge

Samurai Warriors is an action game where you can control one of many historical and fictional characters from the feudal Japanese era and engage in battle against other clans for control over the country. The gameplay consist of action-based battles where the player has to maul through the oppositions army and beat its leader. These premises test the players' reaction, reflex and coordination skills, which places it in the psychomotor-challenge game definition group.
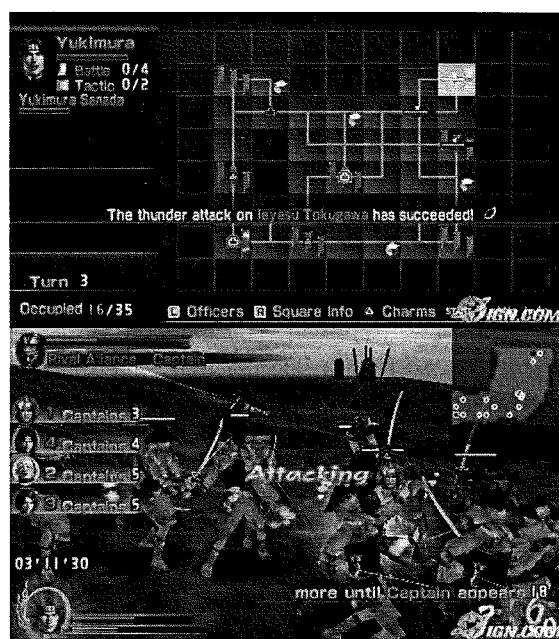
Figure 8. Samurai Warriors Screenshots (IGN Entertainment, 2007). Images show the tactical map screen the player can use to prepare their attack as well as planning the shortest path to the finish area (top image), as well as showing a hectic action sequence from the game (bottom image).

Instead of consisting of big, all-expanding levels, the levels have been divided into smaller, strategic sections, which the player has to conquer to complete the level (Figure 8). This gives the player both short term goals and long term goals to accomplish, at the same time as catering to the portability of the gaming device. All the characters have their distinct weapon and fighting style, which allows the player to

keep developing their skill, concentration and control over the game. To connect emotionally with the player, the game has the intriguing story that is defined in the authentic setting of the Japanese era, as well as allowing the player to raise character and equipment statistics for development. The world is consistent and believable, which supports the way the player experience the game and ultimately connects with the game on an affective level.

The main limitation with this game is that it might become very repetitive quickly, in the sense that you basically do the same thing in each level, hack through waves of enemies and defeat the level main boss. While replaying the game with different characters presents a different storyline and a new set of control challenges, the different sections of a level do have their own mini-challenges such as killing an entrance guard, or lower a level to flood a passage. These aspects do help break the monotony of the hack-and-slashing, but it remains to be seen.

TOOLS & STRUCTURE SUMMARY

This section has provided an overview of all the video-games that were used for this research project. These were selected and analysed to make sure they covered all three challenge-definition groups, psychomotor-, cognitive- and social-challenge. This way, the different types of games allowed us to explore the diverse factors that build up the concept of video-game immersion. Table 4 provides a brief summary of the games regarding their nature, as well as specific design issues important for exploring video-game immersion within each game.

Table 4

Research Game Summary

Game & Platform	Platform	Participant Group	Challenge Definition	Immersive Design Features
LEGO Star Wars	Mac Demo	Questionnaire	Psychomotor Challenge	•Narrative, Goals, Control, Skill, Aesthetics
Sid Meyer's Civilization IV	Mac Demo	Questionnaire	Cognitive Challenge	•Goals, Controls, Challenge, Skill, Concentration
Unreal Tournament 2004	Mac	Questionnaire	Social Challenge	•Skill, Control, Concentration, Challenge, Feedback
Cid Meyer's Pirates!	PC	Online Journal	Cognitive Challenge	•Goals, Control, Concentration, Skill, Narrative, Feedback
Lunar Knights	Nintendo DS	Online Journal	Psychomotor Challenge	•Control, Challenge, Narrative, Aesthetics, Feedback
Samurai Warriors: State of War	Sony PSP	Online Journal	Psychomotor Challenge	•Narrative, Control, Goals, Challenge, Feedback

In the end, the defining characteristics of the two participant groups are the data they provide dependent on the length and reoccurrence of playing the video-game. The questionnaire participants engaged in short term play that provided game focused summative data about immersion factors from a critical perspective, while the online journal participants engaged in long term play, and provided detailed information about users' experiences of immersion over an extended period of time.

The overview and analysis of the video-games provides a starting point for the analysis of the questionnaire responses and online journal entries concerning those games. The following sections conduct this exploration in light of the immersion model (Figure.2)

by identifying the extent of which the design issues in Table 2 matched the responses from the questionnaire and journal entries. This allows for a critical analysis of the data in terms of the nature and extent of the immersion the game produced and how it was experienced by the participants.

ANALYSIS & FINDINGS

The aim of this study has been to explore what constitutes an immersive video-game experience. Two research questions were posed, *what aspects of games makes them immersive, and how an understanding of these factors can help guide video-game design*. These questions have guided the development of the immersion model (Figure.2) to support the findings presented here. By identifying the division of immersion into two distinct zones, cognitive and affective, we were able to categorize different factors and features of games that can generate an immersive experience both on a rational and emotional level. The participants involved produced the data about these concepts by the use of the questionnaire or the online journal. The analysis was done by looking at these immersive features, how they compared with the analysis of the games conducted within the previous section of the methodology of this study, and the research data.

The data gathered from the participants was organized to be able to establish any valid findings. To achieve this, a two-stage process was implemented to structurally go through all the material and establish these findings. The first stage consisted of reading through all the material, which consisted of online journal entries and questionnaire results. This was done to get a feel for what has being said, and identify and list the key themes. The second stage consisted of using this list and while going through the data again, interrogated it and summarized what each participant says about a particular theme (Lester, 1999).

With a clear idea of what all the participants said about a specific theme, the data was triangulated with each-other; findings from the online journal entries and questionnaire results were cross-examined to establish validity. To summarize this workflow structure, a table showing the research questions, the instruments and the approach used to analyse the data was created (Table 5).

Table 5

Approach to Data Analysis

Research Question	Data/Instruments	Approach to Analysis
What aspects of games make them immersive?	• Literature • Video-games • Online Journal • Questionnaire	Descriptive statistical analysis to identify certain trends in immersion within specific games. Using questionnaires allow for a broad look at what makes immersion in video-games.
How can an understanding of these factors help guide video-game design?	• Literature • Online Journal • Questionnaire	Creation of video-game immersion taxonomy and development of toolset for creation of immersion. Using online journals allow for a more narrowed and deep look at 'immersive' factors.

RESULTS

First we will look at how the participant's data from the online journal entries, questionnaire results and feedback correlated with the game analysis, and then we will see how this impacted the theoretical framework. By examining the extent of how the findings correlate with the immersion model (Figure.2) can we answer the two research questions: *what aspects of games make them immersive, and how an understanding of these factors can help guide video-game design*.

The main limitation of the online journal entries was the quantity of entries. All three participants wrote their first-impression entries, but no one wrote a post-mortem entry. Also, only one participant wrote more than one game-progress entry. This limited the study in being able to cross-examine the experience over a long period of time in different games. However, the quality of most, if not all the entries was high, which enabled a deep look into the examination of the immersion factors. The data gathered from the questionnaire did not have any other limitation than the one inherent with questionnaires: the sample amount. The three different game sessions consisted of eight, seven and six participants. However, this enabled the analysis and establishment of certain immersion trends about those games and how the participants experienced them. This was also enhanced by the discussions after each questionnaire session where the game, the experience and the questionnaire were commented on.

The findings will be presented thematically to correlate with the theory presented in the literature review and the immersion model (Figure.2), how the experience of immersion consists of two zones that use cognitive and affective features to generate the state of mind.

COGNITIVE IMMERSION

One major aspect of playing video-games is the interaction the user has with the game. This is one of the two ways a user can experience immersion, by engaging with the cognitive aspects of the video-game. Using the theory and the immersion model (Figure.2) to answer the first research question *what aspects of games makes them immersive*, the cognitive experience of immersion was broken down into six different contributing factors: goals, challenge, player skill, feedback, concentration and control. The games used for the research project were analysed with a critical view of these

factors in mind, and the analysis of how these worked from the point-of-view of the participants was done using the participant's online journal entries, their responses to the questionnaire as well as the discussions after completing each questionnaire.

GOALS

Probably the most defining factor of a video-game is the goals the user has to complete. Most of the time, these are defined inside the game as a type of milestone the player has to accomplish to continue progressing through the game, but that is not always the case. Sometimes video-games have goals that are just there for amusement or to unlock extra content. However, some video-games allow the player to create their own goals for their own amusement or personal gain.

Figure 9. Goals Agreement Scale. Shows the amount of responses from the questionnaires. These results were aggregated from the participants' responses from questions 1 to 4 from the questionnaire (Appendix E), which covered the cognitive factor of goals.

From the result of the data, goals in the games played an integral part in facilitating good gameplay, but were not truly important in the long run to create immersion. However, they can become a "game-breaker", a feature in a game that completely disrupts the facilitation of immersion. Games with goals that are ambiguous, disguised, indirectly implied or just too open ended will not be able to capture players. The participants that played Civilization IV and Pirates commented that both these games suffered from ambiguous and loosely implied goals. The online journal participant playing Pirates stopped playing the game after two sessions, and Civilization IV was the game that the questionnaire participants stated provided the least favourable experience of game goals. Basically, game goals needed to be presented and used in such a context that they appeared believable, which was pointed out by both the participant playing Lunar Knights and Samurai Warriors. They state

that the games had a standard set of goals typical for the type of game, such as finding and buying upgrades or capturing enemy territory by taking over a strategic area, but worked since they had to visit a special game character to be able to apply the upgrades, or that the variety of goals combined with the importance of an area would break up monotonous and otherwise tedious gameplay. The questionnaire participants didn't have any particular comments about LEGO Star Wars and Unreal Tournament 2004, even though they rated both games fairly high on the questionnaire results, as seen on Figure 10. The simplicity of Unreal's goals and the variety of goals in LEGO Star Wars worked well, but were not integral in creating immersion, nor to work as a "game-maker", a feature in a game that fully aids in the facilitation of immersion. Figure 9 visualizes the comparison between the three games and their result in the goals category.

FEEDBACK

The factor of feedback in video-games is a very important one. It is the only way the player can be updated about his progress in the game in terms of goals, challenges, skill development and control. Without an appropriate and easy-to-understand feedback system, the player will not know if he has accomplished goals, if his skills are developing or even knowing where he is in the game world. This becomes a typical game-breaker, where the situation becomes frustrating and will ultimately hinder the construction of an immersive experience.

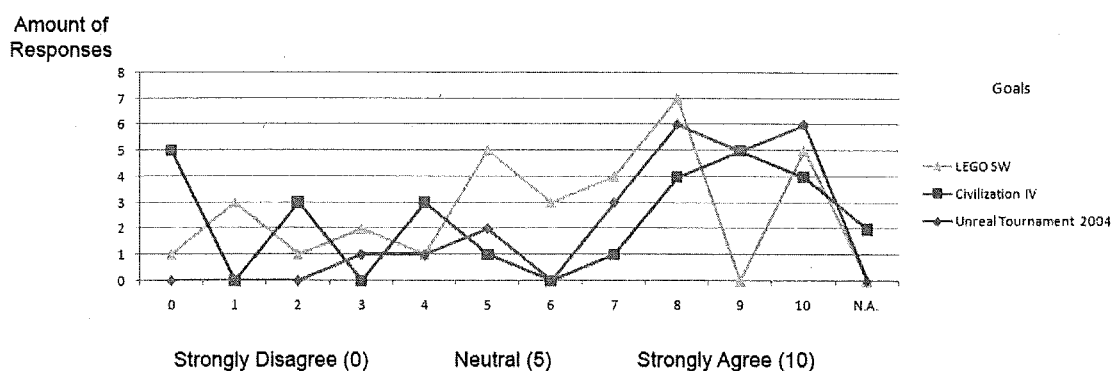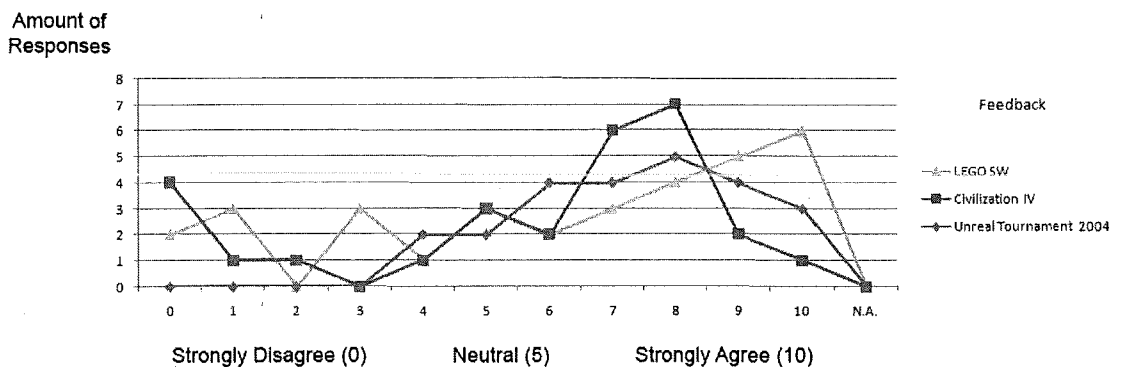*Figure 10.* Feedback Agreement Scale. Shows the amount of responses from the questionnaires. These results were aggregated from the participants' responses from questions 15 to 18 from the questionnaire (Appendix E), which covered the cognitive factor of feedback.

The results show that most participants agreed they had a favourable experience in terms of the feedback in the games (Figure 10). The participants show very little

disagreement in terms of Unreal Tournament providing favourable feedback, while the participants' rating of LEGO Star Wars and Civilization IV show there were some issues with feedback, which were uncovered with the comments and discussion after the game session. Discussions following the implementation of the game suggested that LEGO Star Wars and Unreal Tournament suffered when it came to players being able to orient themselves, since there was no map available over the area so that the player could have an overview as well as knowing their position in the game world. However, participants valued the 'motion sensor' device in Unreal Tournament that allowed them to see nearby enemies, and since the level consisted of two identical bases with a courtyard between them, they found it a fairly easy task to learn the map. However, one participant remarked that this was not possible with LEGO Star Wars, which can confuse the player in regards to where to go to keep progressing in the game. Another participant stated that the biggest limitation in terms of feedback with Civilization IV was the sheer size and content of the interface, which ultimately came down to how much time the participants had available to play the game. Since the player needs to learn almost all the aspects of the interface to truly be able to play the game comfortably, the cognitive load of having to learn game mechanics as well as where to find them in the interface creates a very steep learning curve that can overwhelming some players.

From a longitudinal point of view, all three online journal participants mentioned some of the same properties when referring to favourable feedback. These comments stated that the games stuck to conventions used in similar games, thus providing the players with a consistent and familiar way of receiving feedback, as well as the feedback having to be appropriate to the context of the game and designed with care to fit into the world. None of the online journal participants motioned anything that could become a game-breaker in terms of feedback, but at the same time, similar to the goals factor, it is hard for feedback to become a game-maker since it is also an inherent property of video-games because of their interactive nature.

Skill and challenge are two factors that work hand-in-hand. For video-games to facilitate the player with the ability to test and develop their skills, they have to provide the player with constant and successful challenges. The particular skill required from the player is also intrinsic to the challenge; it can require a great amount of psychomotor-, cognitive- or social-skills to succeed a particular challenge.

Figure 11. Skill Agreement Scale. Shows the amount of responses from the questionnaires. These results were aggregated from the participants' responses from questions 10 to 14 from the questionnaire (Appendix E), which covered the cognitive factor of player skill.

One of the main criteria for a player to test and develop their skill in a game is the time spent playing it. This is evident when analysing the questionnaire participant's data, as almost any game will provide enough challenge and thus the ability to test and develop your skills. Figure 11 shows the participants rated Unreal tournament the game with most favourable player skill, evident by the responses in the strongly agree zone of the agreement scale, while rated Civilization IV mostly at the neutral zone with LEGO Star Wars in-between. A participant stated that Civilization IV was contemplative, had slow-paced gameplay which the participants did not find entertaining, especially with time restrictions. Another participant said that Lego Star Wars was easy to play and the mechanics simple to learn, and could thus provide the participant with more opportunities to test his developing skills. Unreal Tournament, providing a social-challenge by having human players play against each-other, was basically all about the amount of skill the players had before playing the game. This was commented by one of the participants of the loosing team, stating that the game should provide a way to handicap players depending on their skill level.

The data from the online journals enforced the claim that skill and challenge work together, especially for the creation of an immersive experience across several gaming sessions. Whenever one of the participants felt that they were truly challenged and were able to test their skills, they gave a high immersion rating (Appendix F – Figure.3). With Samurai Warriors, whenever the player changed the difficulty setting or changed characters to a more familiar one, he rated the session higher than the previous one. The participant playing Lunar Knights also stated that even though the psychomotor-challenges presented in this game were simple (move, block or attack), the variety in combat where different circumstances and environments had to be taking into account provided the best immersion rating. This supports the claim that skill and challenge work together, as having a wide variety of challenges tends to support immersive gaming experiences.

CHALLENGE

A very important feature for immersion is the level of challenge presented to the player. This feature is prominent in the immersion model, and a key attribute in generating an immersive experience. It can also be seen as a double-edge sword; its influence over the game can become a game-breaker or a game-maker. This occurs because the game's challenge is dependent on other factors such as goals, feedback and control. These factors can in turn create a challenging situation, both in a good way, but also in a bad way.
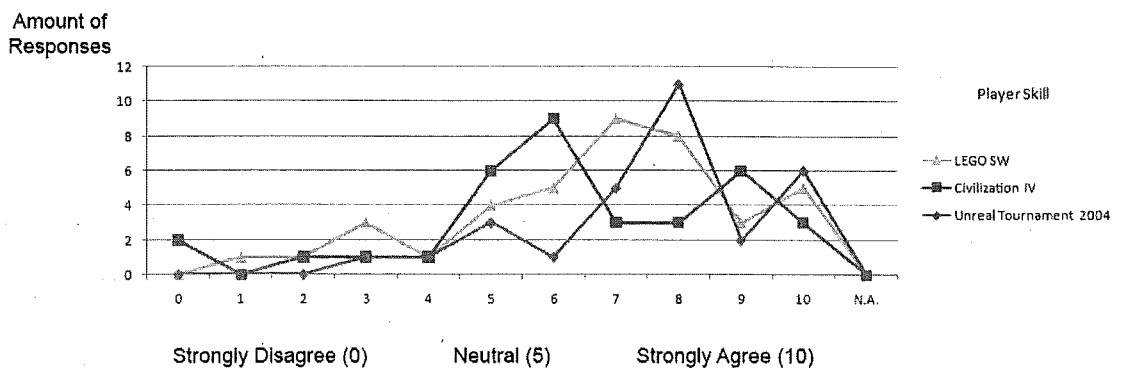

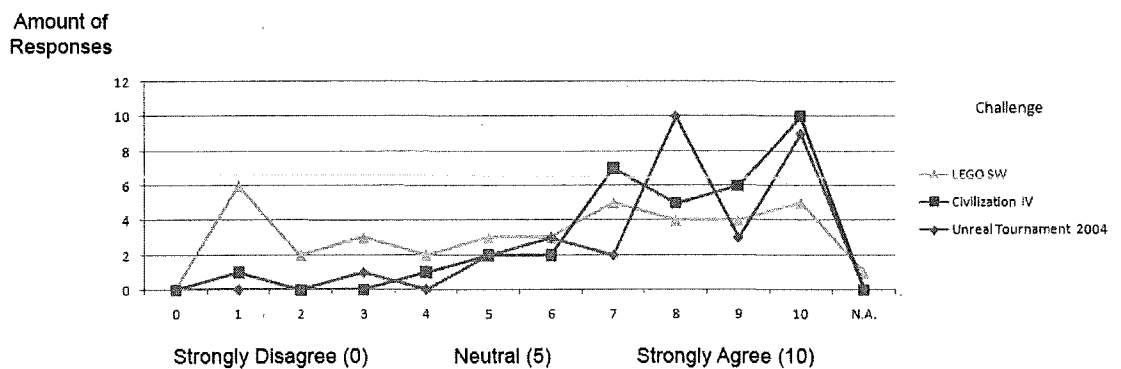*Figure 12*. Challenge Agreement Scale. Shows the amount of responses from the questionnaires. These results were aggregated from the participants' responses from questions 5 to 9 from the questionnaire (Appendix E), which covered the cognitive factor of challenge.

The data results support this claim. When comparing the participants' responses for Civilization IV and Unreal Tournament 2004 (Figure 12), we see the participants agree

that both these games appear to provide an equally challenging experience. However, when cross examining with the results of the goals, feedback and player skill (Figures 9, 10 and 11) factors, we can clearly see how the challenge in Civilization IV became a game-breaker for the participants by not supplying them with an experience with a favourable combination of those immersion features. However, the participant playing Pirates stated that this game suffered from a different problem. Even though the game is also a cognitive-challenge based like Civilization IV, the participant said the game was not challenging enough, simply too easy for him to enjoy, which becomes another typical game-breaker. The participants that played LEGO Star Wars, on the other hand, rated the experience evenly across the agreement scale. The comments and conversation with the participants were valuable to uncover the reason for this, which comes down to personal preference. Some like the simplistic gameplay that allow them to test their skills to the fullest, while others can find this too easy which makes the game very repetitive and boring.

The online journal entries provided a great insight in how challenge in a game can be structured to be successful. The main factor for successful challenges lies in variety. The participants playing Lunar Knights and Samurai Warriors commented that the variety of playable characters and enemies with different story-paths, abilities, playing styles and attack patterns, the variety of environments to explore and different type of equipment to use in both games provided a challenging experience that was constant and positive. Samurai Warriors even allowed the participant to change the difficulty setting, which he said greatly improved the level of challenge. He had initially set it to 'easy', where the challenge was non-existent. Increasing the setting to 'normal' made him feel "like battling out in a proper battle, [which became a] more enjoyable experience". One participant commented that the main reason why Unreal Tournament provided a positive challenge was because it is a social-challenge game. The fact is that, at the core, the game is a competition between humans. This activity has always been a great challenge for us, which we enjoy both to as participants, as well as spectators. Some participants spent a few moments just watching the action unfold in the game, but this did not last long as the remaining team-mates would start to complain. All of these factors generated successful challenging experiences that eventually lead to immersion in the game.

Being able to concentrate on the activity of playing a video-game is one of the most important factors for the successful generation of an immersive experience. Similar to challenges, concentration is dependent on other factors, as well as being able to become a double edge sword as a game-maker or game-breaker. Having to concentrate on something awkward, annoying, unachievable or out of context will lead to frustration and can become a game-breaker. Concentrating on a difficult yet appropriate, achievable challenge will become a powerful game-maker and a tool for the creation of an immersive game experience.

Figure 13. Concentration Agreement Scale. Shows the amount of responses from the questionnaires. These results were aggregated from the participants' responses from questions 19 to 23 from the questionnaire (Appendix E), which covered the cognitive factor of concentration.

The responses from the questionnaire show that a majority of the participants agreed to have had to concentrate a fair amount while playing Unreal Tournament and Civilization IV (Figure 13). The participants' responses showed that all games had issues that prevented the participants from fully concentrating, but LEGO Star Wars attracted the most negative responses from the participants about their level of concentration. They were two reasons for this: some people though the game was too easy thus not requiring a lot of concentration, while others struggled with the controls and were only to concentrate on manoeuvring the playable character on-screen. The participants stated the Unreal Tournament was the game that allowed them to concentrate on the actual game the most: having a simple control scheme with the ability for a competition in a social context allowed players to positively concentrate on the game. The participants stated that Civilization IV also provided them with the ability to concentrate. One participant commented that the pace of the game is suited

for cognitive-challenges where you spend much of the time learning and thinking, but the amount of usable strategies available to play and the high cognitive load work as a deterrent since the player was not able to concentrate on having fun.

The link between concentration and challenges is also prominent in the online journal entries. Two of the participants stated that constant concentration is crucial for an immersive experience. Only when the game presented them with a variety of challenges that forced them to use a mix of their skill set did they feel that their concentration was positive. The participant playing Lunar Knights also made the connection that a well designed feedback system, in particular the interface, would allow for constant concentration. If some of the important interface elements such as health and ammunition amount were not appropriately placed on the screen, it would be very easy to constantly lose concentration.

CONTROL
Feeling that you are in control of your character and the game environment is a powerful game-maker, if perceived this way. A player that is not in control of a situation, for whatever the reason might be, will lose any sense of immersion and become anxious and bored, which is a typical game-breaker. To provide this feeling to the player, other factors come into play, such as challenge, skill and feedback.
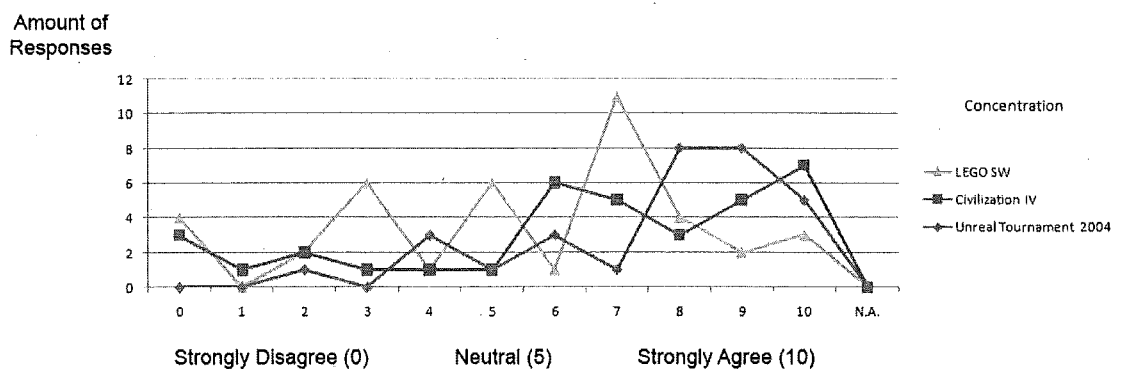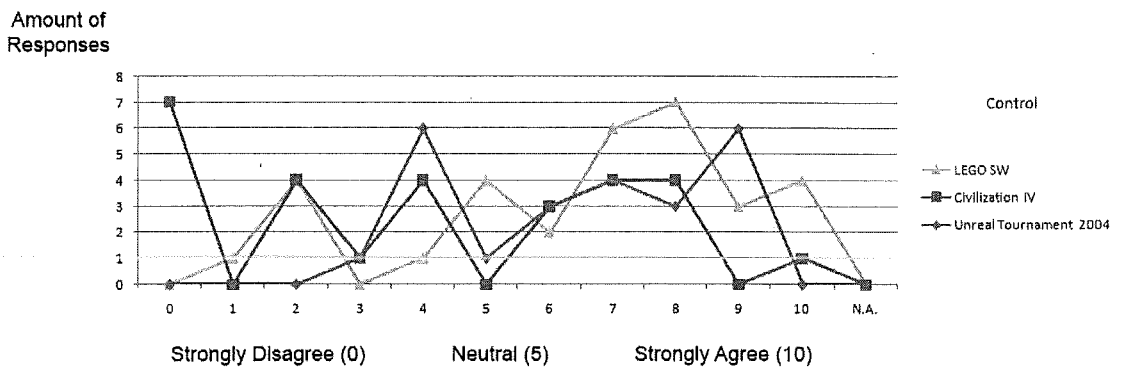

Figure 14. Control Agreement Scale. Shows the amount of responses from the questionnaires. These results were aggregated from the participants' responses from questions 24 to 27 from the questionnaire (Appendix E), which covered the cognitive factor of control.

The results from the questionnaire data show that across all three games, the participants were varied in their experience of their control over the game. When looking at the agreement scale for control (Figure 14), we see that participants rated

Civilization IV as the game that provided them with the least amount of control, which also matches the trend shown with the previously discussed cognitive topics. A participant commented that he never got into the game since it was hard to have any control in the short time made available. Most participants agreed that LEGO Star Wars, with its simple control mechanism, allow for the most positive control experience, although a few commented that the game's control scheme was imprecise using a keyboard. The reason for the division in the responses for Unreal Tournament lies with each individual's skill. Some of the participants were not familiar with the type of control scheme used in the game, and were not able to pick it up in the test period before starting the actual in-game competition. This was confirmed with comments in the discussion were one of the participants always got stuck in the same place when trying to jump over a gap, which was basically the participant inability to precisely judge the distance to the goal area.

This trend is also prominent in the online journal entries. Two of the participants commented that they felt in control when they were comfortable with the control scheme for any of the available playable characters. They stated that, for most of the time, the different playable characters were balanced and worked well, but when using a different one, the control scheme would change and thus thrust the participant into a situation they couldn't control, which could prove to be a game-breaker. This happened with the participant playing Samurai Warriors, when using some of the different characters unique lethal attack, some of them were hard to control and not too useful in battle. The opposite was for the participant playing Lunar Knights. The player was able to adapt to the change and still managed to stay in control, even though the level of challenge was greater. The participants stated that the key difference between the two games in regards to control was that Lunar Knights, having only two playable characters, allowed the participant to have a more structured experience when using any of the characters. On the other hand, Samurai Warriors had over 19 playable characters which made it hard for the participant to have a balanced experience with all the characters. Both participants stated that the most important property of good control seems to be an appropriate balance between simple controls that can be used in any condition to provide the desired outcome.

When comparing the three games across all cognitive immersion factors, almost all the participants have agreed that Unreal Tournament was the game that promoted these categories the most in a favourable way (Appendix F – Figure 1). LEGO Star Wars and Civilization IV were also able to generate favourable outcomes, but they also generated a fair share of negative responses among the participants. These disagreements have been analysed and explained using the available data from the questionnaire results, comments and discussion, as well as the online journal entries. The overall importance of these cognitive factors in generating immersion will be discussed later in this section.

AFFECTIVE IMMERSION

Another important aspect of playing video-games is how they manage to engage players on an affective level. However, it is important to distinguish the type of emotions that are products from the cognitive factors (such as frustration and anxiety from unrealistic goals), and the emotional connections that we generate while playing some video-games (such as empathy or self-consciousness). These affective aspects were established in the immersion model (Figure.2) and include the aesthetics and narrative of the game, as well as how the player identifies with the video-game. Using the participant's online journal entries, their responses to the questionnaire and the discussions after completing each questionnaire, an analysis was done on how these factors affected the participants from their viewpoint.

AESTHETICS

The visual style of a video-game is of great importance to the overall experience the end user has while playing the game. These styles include abstract (usually used in puzzle games), stylized (cartoon style) onto photorealistic games. The particular visual style of a video-game can help enhance or break the immersive experience, which turns aesthetics into a game-maker or game-breaker. The main issue with aesthetics is that it needs to be visually pleasing, at the same time as it is appropriate to the setting of the game, a property from the narrative factor which will be discussed later.
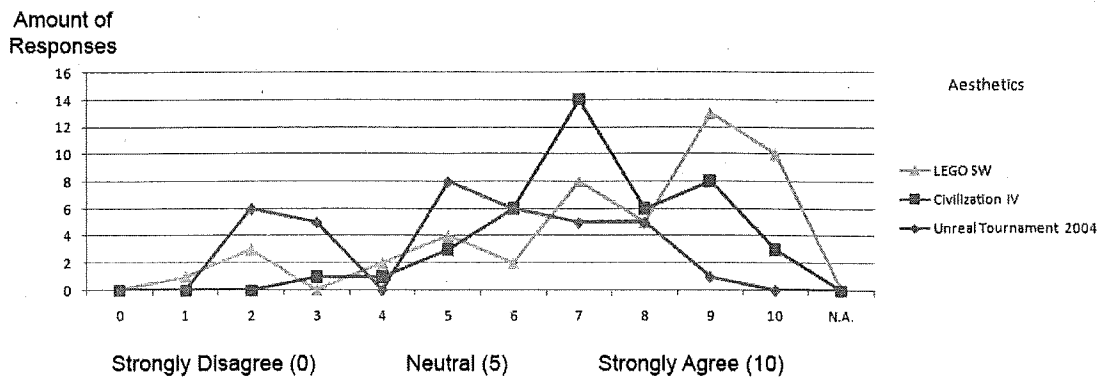
Amount of
Responses

Figure 15. Aesthetics Agreement Scale. Shows the amount of responses from the questionnaires. These results were aggregated from the participants' responses from questions 28 to 33 from the questionnaire (Appendix E), which covered the affective factor of aesthetics.

When it comes to the aesthetic properties of the three questionnaire games, we see from the participants' responses that LEGO Star Wars and Civilization IV were the games that they were the most content with (Figure 15) in this regard. Most of the participants had minimal disagreement with having a favourable experience with those two games. On the other hand, the participants' responses for Unreal Tournament were very varied and are spread throughout the agreement scale. The reasons for these responses were uncovered using the questionnaire comments as well as the post-questionnaire discussions.

Several participants stated that the main reason Unreal Tournament scored this way was because of technical aspects. Some of the participants experienced several graphical issues while playing the game on the Macintosh platform. Being a game that uses a 3 dimensional view with the perspective from the player's point-of-view, it tries to visually represent a world in the same way as we perceive our own. The game thus requires fairly powerful hardware to be able to run smoothly and satisfactory, which not everybody experienced when playing the game on the Macintosh platform. Second, the personal preference of some of the participants did not correlate with the futuristic, sci-fi setting of the game, which also explains the negative results of the game. The reason why the participants rated LEGO Star Wars' aesthetics so favourable was attributed by the participants to the familiarity both LEGO and Star Wars franchises carry with them. A participant stated that the game world managed to create a synergy between the two brands which was believable and aesthetically

pleasing that was consistent with the Star Wars universe as well as the mechanics of LEGO blocks.

From the data collected off the online journal entries, one particular trend was obvious in relation to the aesthetics of a video-game. The look and feel of the game must be appropriate and in context to the game setting. The participants playing Lunar Knights and Samurai Warriors were both using portable handheld gaming devices (Nintendo DS and Sony PSP), which inherently limits the overall aesthetic experience by limiting graphics and audio quality. However, neither of the participants had negative comments about the games in light of this, which might be attributed to the fact that they were fully aware of this inherent limit. The participants play these types of games often, which allowed them to disregard any graphical issues that less experienced users might find distracting and an overall deterrent or game-breaker for the generation of an immersive experience.

NARRATIVE

A majority of today's video-games contain some sort of narrative, in the sense of providing the player with an experience of a world with inhabitants and its own story. These narrative features (plot, setting and characters) are a very important tool to use for generating an immersive experience. It is not necessary for games to utilize all three features, but it remains to see how important each feature is for a game when trying to create an immersive experience using a narrative structure.
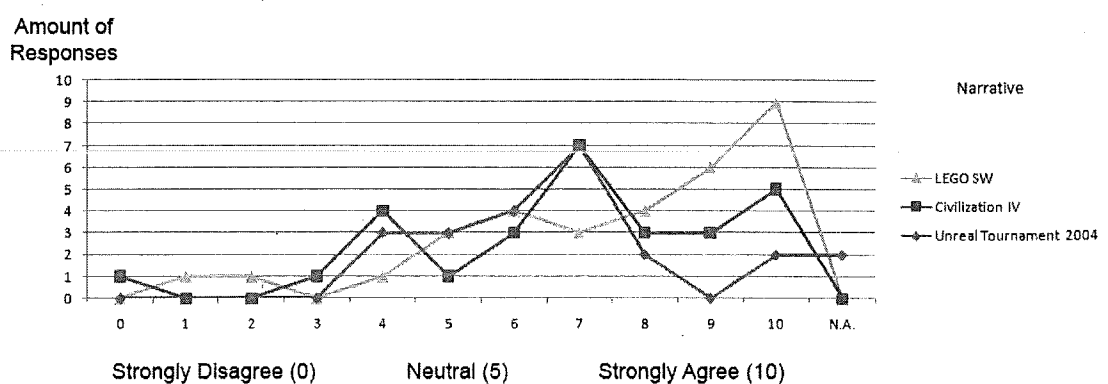

Figure 16. Narrative Agreement Scale. Shows the amount of responses from the questionnaires. These results were aggregated from the participants' responses from questions 34 to 37 from the questionnaire (Appendix E), which covered the affective factor of narrative.

The results of the questionnaire show a general consensus among the participants about having a favourable narrative experience. They agreed the strongest with LEGO Star Wars providing the most favourable narrative experience, while Civilization IV and Unreal Tournament had some of the participants give negative responses, which did not lead to a strong agreement about the experience. The participants commented that the reason for this was that LEGO Star Wars managed to create a great synergy between the LEGO setting and the Star Wars plot and characters that seem highly believable. One of the ways this was done was by allowing the player to 'use the force' on the game environment. One of the participants mentioned in the discussion that since a majority of the game world was made out of LEGO blocks, the participants were able to use this magical energy to move, break down or create structures as required. This, and the combination of the familiarity of the Star Wars franchise, almost all the participants strongly agree that LEGO Star Wars provided them with a narrative experience that was highly favourable (Figure 16). There were no comments for the reason why Civilization IV and Unreal Tournament did not score as high in this regard. The games themselves do not provide the player with a specific plot, which may be the reason. This doesn't work against these games, but it does seem to limit the strength of the overall narrative experience a player can have with these games.

Several entries made by the participants in the online journal point out three trends in regards to creating an immersive experience with the aid of narrative. These are presentation, context, development and credibility. Presentation and context of the world, characters and story is integral for the player to become accustomed with the game. The development of this factors need to be credible so that the player truly believes what is happening in the game reflects truth or logic. This was the main game-breaker for the participant playing Pirates, he felt that the game world was not believable and the story was too loosely implied to fully understand what had happened as well as what the player was supposed to do. Combined with issues such as naming items 'sword+3' to show that it is more powerful than a regular sword, provided the participant with a setting that was not believable and offered no depth.

The participant playing Lunar Knights commented on how consistent the narrative was in terms of presentation, context, development and believability. In one of his

entries he stated how the use of anime cut-scenes and audio to show character development really helped him believe the characters were real. On the other hand, the participant playing Samurai Warriors was disappointed with several aspects of the game. Being a fan of Japanese samurai culture, he noticed immediate errors with the way the game portrayed Japanese samurai culture at the set time period. For example, none of the initial playable characters used a katana sword, which is the biggest icon in samurai history, as well as portraying historical figures in such a way that they seem very immature. However, they were presented in a proper way, which made them seem believable in the context of the game, as well as the game world being highly accurate in their representation of feudal Japan. His experience of the game narrative changed dramatically after a few sessions, where he was finally able to unlock a character that allowed him to use a katana sword.

IDENTITY

The perception the user has while playing video-games is of high importance when trying to determine if the user is immersed or not. The determining factors include the self-consciousness of the user while playing the game, as well as any emotional connections the player makes with the video-game world, setting and characters.
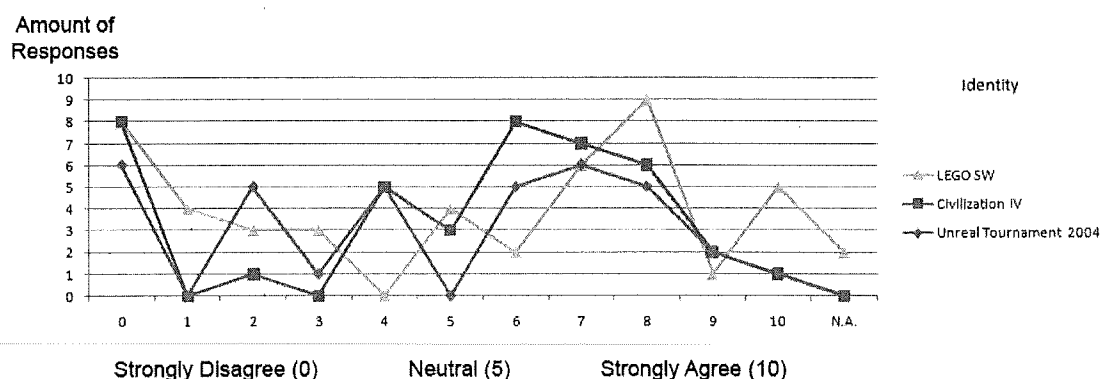
Figure 17. Identity Agreement Scale. Shows the amount of responses from the questionnaires. These results were aggregated from the participants' responses from questions 38 to 43 from the questionnaire (Appendix E), which covered the affective factor of identity.

The participant's questionnaire responses vary across the agreement scale for all three games, but show a common, unfavourable attitude towards the experience among several of the participants (Figure 17). This can be attributed to personal taste, but when cross-examining these results with the questionnaire comments and discussion, we can get a clearer picture. The participants were divided in their answers, but the

responses where similar independent of what game was discussed. Basically, some participants felt little or no emotional involvement in the games, as one participant commented on the LEGO Star Wars characters saying that they are just silly plastic figures and that you constantly have to change character to a different character to progress in the game. Others commented that because of the time constrictions, it was hard to get involved in any of the games. On the other hand, some participants felt an attachment to the character they were playing and were disappointed whenever the character was killed or died in the game. With Unreal Tournament, some of the players became so involved that they started to relate the character to themselves, to the point where they would become frustrated because "they" kept on dying in the game.

The data from the online journal show a different side to this. None of the participants made any comments about their level of self-consciousness while playing the game, or being able to relate the character to themselves. However, both experienced some emotional connections on different levels. The participant playing Lunar Knights would feel powerful and confident when playing with a strong and powerful character, but feel fragile and vulnerable when playing with a young, inexperienced and weak character. The participant playing Samurai Warriors was not able to create such strong emotional connections with any of the playable character, but the participant did state that once he finally had unlocked the only character in the game that used a katana sword, he felt a sense of self satisfaction running around in the game, being able to play the only character that had such a weapon.

When we compare the participants questionnaire responses for all three games across all the affective factors, we see that LEGO Star Wars and Civilization IV are the games that manage to favourable convey these factors to the participants (Appendix F – Figure 2) the most, while Unreal Tournament is the game with the most mixed responses about the same factors. The reasons for this have been explained by comparing the immersion model (Figure.2) against the available data from the questionnaires and online journal entries. The overall importance of these affective factors creating an immersive experience will be discussed in the following section.

OVERALL LEVEL OF IMMERSION

The last aspect of the experience of immersion is the degree of how immersed the player is, from their own point of view. It is important to establish if immersion is experienced the first time someone plays a game and how, as well as the longitudinal experience of immersion over several game-sessions. An examination of how the participants experienced immersion in the light of the immersion factors outlined in the immersion model (Figure.2) created by analysing the participant's online journal entries, specifically their immersion rating, as well as the questionnaire results (aggregated from the participants' responses from questions 44 to 58 from the questionnaire in Appendix E, which covered the level of immersion), comments and discussion following their implementation.

Most of the participants agreed that out of the three questionnaire games they played through, the game that immersed them the most was Unreal Tournament 2004. LEGO Star Wars and Civilization IV were both successful and unsuccessful in this regard, since participants rated both games on both side of the agreement scale (Appendix F – Figure 3). To find out the reason for this, the research data for each game was compared against each-other to find any particular trends.

When the results for the cognitive and affective factors were compared against the level of immersion results for the questionnaire games, an indication as to why the participants rated the games the way they did emerged. The participants showed the greatest level of agreement about Unreal Tournament (Appendix F – Figure 6) providing them with a favourable immersive experience. When looking at how the participants rated the game's cognitive and affective factors, we see an agreement about the game providing them with a favourable cognitive experience, but they were in disagreement about the affective experience. The cognitive factors of challenge, player skill and concentration were given the highest scores by the participants, which show how influential the hectic and high-tempo of the game was. On the other hand, the participants show great disagreement about the affective experience, which was attributed to technical issues, time constrains and personal taste by the participants. However, the greatest amount of agreement for a favourable immersive experience among the participant was while playing Unreal Tournament, which can only be

credited to two aspects: a strong and effective cognitive experience mixed with the competitive and social aspects inherent to the game. Several participants commented that they were quite immersed because of the teamwork and grouping that the game provided the players, but not by the futuristic look and feel of the game.

The overall participant responses for LEGO Star Wars (Appendix F – Figure 4) and Civilization IV (Appendix F – Figure 5) displayed different trends. The cognitive experience provided by these two games to the participants was very mixed and could not show any conclusive results. It seems that the biggest letdown for some of the participants in terms of LEGO Star Wars was the level of challenge the game provided was too simple. Several also commented how, in terms of Civilization IV, the lack of clear goals and the feel of being in control, matched with a limited amount playing time created a challenging situation that was unattainable for most of the participants.

In terms of an affective experience, the participants showed the strongest agreement level while playing LEGO Star Wars, with Civilization close behind. The contributing factors for LEGO Star Wars in terms of a favourable affective experience were the aesthetics and narrative of the game, where almost all the participants agreed that the look and feel of the game (consisting of LEGO blocks) and the narrative aspects (using the Star Wars movies) were the biggest contributors to these results. Civilization IV received more modest results in terms of the same factors, but none of the participants had any comments about this issue that could explain the specific reason.

In terms of level of immersion, a majority of the participants rated LEGO Star Wars with an unfavourable immersive experience (Appendix F – Figure 4). It appears to ultimately come down to personal preference, as several of the participants indicated. The average age of the questionnaire participants was 22 years, while the target audience for this game is young children, which played a role in terms of providing an appropriate challenge for the participants. Also, if the participant doesn't enjoy LEGO toys or Star Wars, it becomes virtually impossible to become immersed in the video-game. Still, a few participants commented that the game was more entertaining than they originally though considering the premises, and that the 'cartoonish' look of the game affected their immersion level in a positive way. However, the simplest explanation might be the best, where a participant stated that the look and feel of the

game, and the plot from the Star Wars movies was quite polished and immersive, while the gameplay and the way the game had been designed did not stand in contrast to this.

Almost all the participants seem to agree on one thing, Civilization IV was without a doubt, the game that had the highest level of disagreement about providing a favourable immersive experience (Appendix F – Figure 5). The participants gave the cognitive and affective factors of this game very similar rating as they did with LEGO Star Wars, but when comparing the results for the two games, two differences emerge. On a cognitive level, it seems that the overwhelming level of challenge was just too much for the participants to handle in the short allowed time, or as one participant commented, "too hard to play quickly". Since the participants were not able to play the game for a long time, they were unable to construct any sort of story development according to what they were doing in the game. This was confirmed by almost all the participants where they said they needed more time to learn the interface and required skills and tactics to play the game, but at the same time the game provided them with enough of a challenge to become immersed, if they would have been able to spend enough time playing it.

When it comes to the data generated from the online journal entries, trying to find out which game was more immersive was an impossible task. This was expected, because of the face that as each participant played a particular game, the P.O.V. of the journal entries was highly subjective, as well as the limitations mentioned earlier. Nevertheless, certain trends were established using the immersion rating (Figure 18) the participants gave the game they played after each session, as well as cross-examined this data with the game analysis as well as the results from the questionnaires.
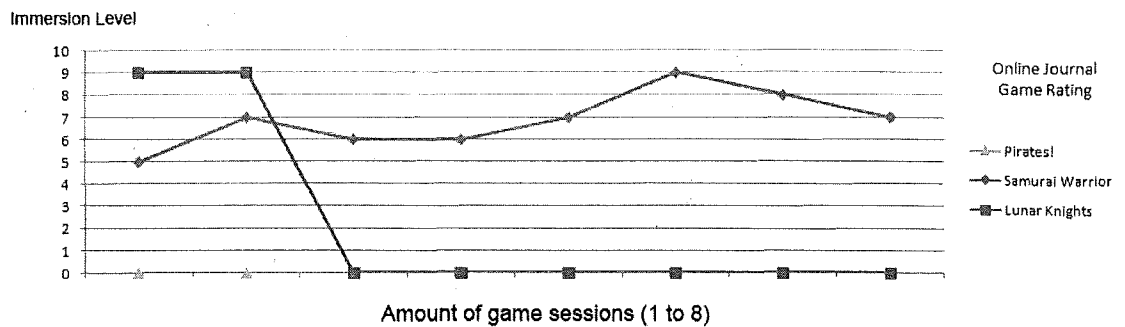
Immersion Level

Amount of game sessions (1 to 8)

Figure 18. Immersion Level Across Sessions. These scores were given by the participants after each gaming session. Note: the scores of "0" for Pirates and Lunar Knights were displayed as such because the participants playing those games failed to provide an immersion rating for that particular game session.

As stated earlier, the data from the online journal entries was limited and inconclusive. The participant playing Pirates wrote two entries but never rated his immersion level, the participant playing Lunar Knights provided a rating, but only wrote two entries. The data from Samurai Warriors was more conclusive, but the participant never wrote the post-mortem journal entry which would have helped in creating a critical summary of his experience over time. Still, several trends have been identified using the game analysis and questionnaire results. The biggest reason Pirates didn't manage to engage the user was because the game world did not seem believable to the participant, to him it seemed more like work than fun. Lunar Knights, on the other hand, managed to engage and immerse the participant in a great way, which is evident by the ratings the participant gave the game sessions. The reason for this was how familiar the game was to the participant, following established conventions for several cognitive factors such as challenge, feedback, control and narrative. The participant stated that even though he had played through very similar games in the past, the subtle twists and changes this game had to this pre-described formula made the game engaging and immersive.

However, the best results were gathered from the participant playing Samurai Warriors. From looking at Figure 19, we see that his enjoyment and immersion level is higher at two distinct places. When analysing the journal entries, it seems that whenever the participant had a particularly favourable experience with either a cognitive or affective factor his immersion level rose. The first time this happened was in the second session when he changed the difficulty level from the previous session, providing the needed level of challenge for the participant to become more immersed.

However, the player grew accustomed to this level of challenge quickly, and it was not until the sixth session that his level of immersion rose again. This was attributed to the unlocking of the hidden character of Jubei, a highly recognized historical figure in feudal Japan. This character was the only one that wielded a katana sword, which was one of the main preconceptions that the participant had about this game. Being a fan of Japanese history, unlocking this character and gaining a katana sword were the single most important reason for his immersion level to reach such a high level. Other than that, the repetitiveness and simplicity of several of the cognitive aspects with the flaws found in the affective aspects did not provide enough overall to be able to keep the level of immersion constant while the participant played the game.

APPLICATION OF FINDINGS – IMMERSION DEVELOPMENT GUIDE

From the above findings and analysis, we can draw several assertions about how video-game immersion is generated. These claims are backed up by cross-examination of the research data against the immersion model (Figure.2) described earlier in the thesis. These findings can be used as a guide to design and develop an immersive experience in video-games.

1. **Not all cognitive and/or affective factors need to be present to generate an immersive experience**. This is evident when looking at how the participants rated their Unreal Tournament playing session. The game scored very high consistent throughout the cognitive factors, but failed in providing a consistent, favourable affective experience. Nevertheless, players rated that game and that session as the most immersive of all games. Similar, the participant playing Samurai Warriors had the highest immersion rating when he could play as a legendary swordsman, which is an affective factor. When playing with any of the other characters, the participant was never as immersed.

2. **Any of the cognitive/affective factors can work for, or against the game.** In terms of an immersive experience, these aspects can become a game-maker (a feature in a game that fully aids in the facilitation of immersion) or a game-breaker (a feature in a game that completely disrupts the facilitation of immersion). However, it is much easier for any of the factors to become a game-breaker, but only a few can become a game-maker. A consistent, favourable

level of challenge, appropriate control over the game and a strong narrative can all become game-makers by themselves.

3. **The cognitive factor of challenge works as an umbrella for other factors.** Challenge works in tandem with other factors such as goals, feedback and player skill. Whenever these factors work well for the user, they experience a constant favourable level of challenge that which allow them to become immersed in the activity of playing the game. Games that provide unfavourable goals and feedback can still generate a high level of challenge, but it quickly becomes a game-breaker by providing the user with challenges that are insurmountable.

4. **Games struggle to engage users other than their intended target audience.** Players that are familiar to the game type/genre/challenge-group find it easier to become immersed than player that do not. This is linked to the familiarity aspect where similar games have similarly designed cognitive aspects (goals, feedback and player skill), which players of these games learn and know how they work beforehand, which allow them to jump right into the game without having to learn too many new game mechanics.

5. **Credibility and believability are two major aspects of the affective factors.** However, they are not linked to "realism", as games do not always try to mimic "reality". The aesthetics and narrative of a game has to be credible as to appear believable to the player. The look and feel of the game has to be consistent and credible from the point of view of the narrative of the game world for the user to really believe what is happening is true and logical.

6. **Willing suspension of disbelief.** Ultimately, players have to willingly allow themselves to become immersed in the game playing activity, in that they know they are playing a video-game, which in turn has innate limitations in terms of aesthetics, narrative and control. Players that fit into the previous condition, either by being the target audience or by having played similar games before, will find it a lot easier to become immersed because they willingly disregard faults and limitations inherent to videogames that would otherwise prevent unfamiliar players from becoming immersed in the activity.

7. **Time is of essence**. To be able to generate the level of skill needed to withstand the challenges presented by the game, as well as becoming familiar with the mechanics of the game in terms of goals and feedback, not to mention the development of concentration in the activity. It is very important that games are designed with time as a factor, as not everybody can play a game for hours on end.

CONCLUSION

The purpose of this thesis has been to develop a model of immersion (Figure.2) in video-games and how it can be used for games design. This model was based on flow and motivational theory as well as elements of gameplay and narrative. The experience of immersion while playing a video-game is something most people can relate to, because it is the same feeling we get whenever we get deeply involved in a special activity. Activities such as reading a great book for hours or playing a table-tennis game in a friend's house can both become an immersive experience, given certain conditions can be met. The different types of immersion between these activities are apparent; reading a book engages the user on an affective level via narrative, while table-tennis engages the user on a cognitive level. However, playing video-games is the only activity that can engage the player on both these levels, and bring forward both these types of immersion.

The model of immersion (Figure.2) proposed was then used together with the tools developed for the research project, which were outlined and explained in the methodology section, to provide data on the experience of video-game immersion from the point of view of the research participants. Since the participants were divided into two groups to, one to see the immediate response of the participant after a game session and the other to see the longitudinal experience of playing a video-game. This data was crucial, as it would highlight and verify the important factors in the immersion model and ultimately aid in finding the answer to the first research question, what aspects of games make them immersive. To try and find the answer, the data was analysed against the immersion model.

The result of analysing the data generated seven assertions which can be seen as rules of thumb when designing a video-game. These include: Not all cognitive and/or affective factors need to be present to generate an immersive experience; any of the cognitive/affective factors can work for, or against the game in terms of game-maker and game-breaker; the cognitive factor of challenge works as an umbrella for other factors, such as goals and feedback; credibility and believability are two major aspects of the affective factors; games struggle to engage users other than their intended target

audience; the willing suspension of disbelief participants choose to enter and the issue that time is of essence when playing a video-game.

When designing video-games, be it as an entertainment product or a serious game, one should attempt to use these assertions as guidelines to support the design and development of such products. The first two guidelines should be considered together, to be fully aware that the game does not need to strongly engage the user both on a cognitive and affective aspect. However, any of the factors that are involved can work both as a game-maker or game-breaker to the user. This can work well for the designer and the video-game, and guide the development of the game around a particularly well designed immersive feature, a game-maker. At the same time, the remaining factors need to be checked and analysed to make sure they do not create a game-breaker, which can then nullify the effect the game-maker has on the user.

The connection between the level of challenge and other factors that work to build a favourable level of challenge is an important one which designers need to be conscious about the third guideline when developing video-games. If there is no synergy between the goals, feedback and player skill, the level of challenge will become a game-breaker. Guideline four works very much like the old saying "if it is not broken, why fix it". If designers are developing a game similar to others already available, they should stick to conventions used, as to provide their users with familiar aspects, allowing them to get into the game a lot easier than if they were to use a completely new twist to an already appropriate formula.

Guidelines five and six talk about the same concept. Video-game players willingly forgo their disbelief about the game world not being real. However, they are very critical about how the game presents itself in terms of story, game world and characters that inhabit the world and these must be designed to provide a feeling of "truth" to the player. To be able to design games after this guideline, developers need to design a game world that is consistent and credible, and presented in an appropriate way.

The last guideline poses a huge challenge for designers. Since they cannot control how long a user plays a particular video-game, it is hard to design for an immersive

experience no matter how short or long the game session is. However, to solve this problem, designers can try and break up the game into "bite-sized" chunks of gameplay, similar to a level of a Pac Man game, that are then connected to the larger underlying cognitive and affective factors that make up the whole game.

This thesis has explored the concept of video-game immersion to be able to use the knowledge to aid the design and development of this experience in video-games. Using the immersion model (Figure.2) developed through the use of the discussed theory and the data from the research project with participants playing video-games and describing their experience, the establishment of seven different assertions and conditions were made. These assertions and the immersion factors proposed in the model have answered the initial research question, what aspects of games make them immersive. However, it is not suggested that this is a complete guide, but more of a set of guidelines. Further studies can try and determine the amount of influence the platform technology plays in generating the experience, as well as particular interface and control schemes.

By understanding and following these guidelines during the design and development stages of a video-game, developers can make sure that all the right conditions are present for players to experience which will ultimately lead them to become immersed. However, none of this is guaranteed, and using the seven assertions as a foolproof plan to guide the development of a game experience is not sufficient. The way this thesis has tries to answer the second research question is by providing what can be seen as the first step in understanding how the state of immersion is experienced by video-game players, which can ultimately lead to the development of a proper set of tools for the creation of an immersive video-game experience.

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APPENDIX A – LETTER OF INFORMATION: ONLINE JOURNAL GROUP

An exploration of the concept of immersion

My name is Cesar Manuel Saez Ojeda and I am a student at Edith Cowan University [Student Nr: 2035904]. I am currently conducting my Honours research project in Communications, where the title for the project is:

In the Game.
An exploration of the concept of immersion in games and its usage in video-game design

This project plans on exploring the concept of immersion in video-games and how the findings can be incorporated back into game design so that immersion is assured in the design and development stages of a game development lifecycle. The aim of the project is to find out what constitutes an immersive video-game experience.

I would like to ask you for your participation in this research. Your role will be an important one, as I hope to generate a set of tools from the findings that will aid in the design and development of immersive video-game experiences. Should you accept this role, there are two things I need to ask of you:

- That you play a particular game for no more than 4 weeks, where you have to keep a journal describing several aspects of the video-game experience, covering narrative and gameplay elements as much as immersive elements.
- Every fortnight the participants will meet to have a focus group discussion about the topics you have been writing about in your journal. This activity is to discuss your experiences with the group.

My role will be to host and moderate the meetings and provide the group with topics that will be discussed in each meeting.

Your participation is completely voluntary. You may withdraw at any time. I do not anticipate that any of the information I will be requesting will be of any personal nature. You also have the choice to not answer questions you feel uncomfortable with.

If you wish to ask any questions concerning the research, please contact myself or if there are other concerns and you wish to speak with an independent person about aspects of this research, please do not hesitate to contact Dr. Jan Grey, Chair of Faculty Ethics Committee on phone (08) 9370 6320 or email jan.grey@ecu.edu.au.

If you agree to participate in the project, please sign the attached consent form.

Yours sincerely

Cesar Manuel Saez Ojeda

Supervisor: Mark McMahon
08 9370 6434
m.mcmahon@ecu.edu.au

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My name is Cesar Manuel Saez Ojeda and I am a student at Edith Cowan University [Student Nr: 2035904]. I am currently conducting my Honours research project in Communications, where the title for the project is:

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I would like to ask you for your participation in this research. Your role will be an important one, as I hope to generate a set of tools from the findings that will aid in the design and development of immersive video-game experiences. Should to accept this role, there are two things I ask of you:

- That you play a particular game that will be presented in *GDT3101: Serious Games* on a week-by-week basis for no more than four times. The time this will take will vary depending on the sort of game that is being tested.
- After the gaming session, you have to complete a questionnaire about the experience. This should not take more than 15 minutes. This questionnaire will ask simple questions regarding your experience playing that particular game ranging from narrative to gameplay aspects.

My role will be to provide help and support while the participants are playing the game, as well as gathering the material generated from the gaming sessions.

Your participation is completely voluntary. You may withdraw at any time. I do not anticipate that any of the information I will be requesting will be of any personal nature. You also have to choice to not answer questions you feel uncomfortable with. This also does not have any impact on your completion of *DGT3101: Serious Games*, as well as having anything to do with your actual grade in the unit.

If you wish to ask any questions concerning the research, please contact myself or if there are other concerns and you wish to speak with an independent person about aspects of this research, please do not hesitate to contact Dr. Jan Grey, Chair of Faculty Ethics Committee on phone (08) 9370 6320 or email jan.grey@ecu.edu.au.

If you agree to participate in the project, please sign the attached consent form.

Yours sincerely

Cesar Manuel Saez Ojeda   Supervisor: Mark McMahon
███████████   (08) 9370 6434
███████████   m.mcmahon@ecu.edu.au

An exploration of the concept of immersion

I, _____, agree to participate in the project *an exploration of the concept of immersion*. I understand that my role will be:

- To play a particular game for no more than 4 weeks, where you have to keep a journal describing several aspects of the video-game experience, covering narrative and gameplay elements as much as immersive elements.
- Every fortnight the participants will meet to have a focus group discussion about the topics you have been writing about in your journal. This activity is to discuss your experiences with the group.

Cesar Ojeda (the researcher) will host and moderate the meetings and provide the group with topics that will be discussed in each meeting.

I acknowledge that by participating, the results of this will be used in research. I understand that no information that can identify me by name will be published as part of the research.

I am aware that this is purely voluntary. I can withdraw at any time, and can choose not to answer any questions that I am uncomfortable with.

Name:

Signature:

Date:

An exploration of the concept of immersion

I, _____, agree to participate in the project *an exploration of the concept of immersion*. I understand that my role will be:

- To play a particular game that will be presented in *GDT3101: Serious Games* on a week-by-week basis for no more than four times. The time this will take will vary depending on the sort of game that is being tested.
- After the gaming session, you have to complete a questionnaire about the experience. This should not take more than 15 minutes. This questionnaire will ask simple questions regarding your experience playing that particular game ranging from narrative to gameplay aspects.

Cesar Ojeda's (the researcher) part will be to provide help and support while I am playing the game, as well as gather the material generated from the gaming sessions.

I acknowledge that by participating, the results of my participation may be used in his research. I understand that no information that can identify me by name will be published.

I am aware that this is purely voluntary. I can withdraw at any time, and can choose not to answer any questions that I am uncomfortable with.

Name:

Signature:

Date:

Age

Gender

I play videogames…

| Daily | Weekly | Less than weekly | Monthly | Less than monthly |

Gameplay – How you interact with the videogame

(Answer from Strongly Disagree (0) to Strongly Agree (10) or N.A. (not applicable) where appropriate)

1. I found the point of the game obvious — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
2. I was able to create my own goals — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
3. I found the purpose of the game to be achievable — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
4. Achieving goals was a worthwhile point of the game — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

5. Playing the game was challenging — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
6. The level of challenge was constant — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
7. I had to work hard to succeed in the game — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
8. Success in the game was dependant on my skills — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
9. I was able to cope with the difficulty of the game — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

10. The game allowed me to test my skills — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
11. The game allowed me to develop my skills — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
12. My performance in the game was based on my ability — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
13. I was able to adapt to different events in the game — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
14. I got better at the game as it went on — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

15. I was always aware of my progress in the game — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
16. I knew what was happening as the game played out — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
17. I knew what options were available — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
18. I could see the results of my actions most of the time — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

19. The game grabbed my attention — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
20. The game made me think — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
21. The game maintained my concentration — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
22. My concentration while playing the game was constant — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
23. I had to focus to succeed in the game — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

24. Playing the game became very natural to me — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
25. I felt I was in control of the game — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
26. I felt in control even in hectic situations — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
27. I felt that what I did had an impact inside the game world — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

How was the gameplay balanced? Any "deal-breakers" or improvements?

Identity – How you felt while interacting with the videogame

(Answer from Strongly Disagree (0) to Strongly Agree (10) or N.A. (not applicable) where appropriate)

28. The game was visually pleasing — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
29. Colour was used appropriately — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
30. The look of the game setting was appropriate to the game — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
31. The look and feel of the game were polished — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
32. The quality of the visuals were above my expectations — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.
33. The look of the game contributed to my level of — 0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

immersion

34. My expectations of the game were fulfilled

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

35. Objects in the game matched the setting

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

36. Game objects, plot and setting of the game seemed credible to me

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

37. Game objects, plot and setting contributed to my involvement in the game

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

38. I could identify with what was happening in the game

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

39. I cared about the game objects I was interacting with

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

40. Objects in the game got a life of their own

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

41. It felt like game objects had personalities

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

42. I took it personally when things happened to the game objects

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

43. Unconsciously I sometimes believed I was the game object (e.g. When you think "their shooting at me!" rather than "…at him/her/it!")

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

How emotionally involved were you in the game? Any "deal-breakers" or improvements?

Immersion – Your level of engagement and involvement

(Answer from Strongly Disagree (0) to Strongly Agree (10) or N.A. (not applicable) where appropriate)

44. I thought of other things I could be doing while playing the game

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

45. I stopped thinking about everyday life and only focused on playing the game

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

46. I was "in the zone"

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

47. At times I felt I was part of the game

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

48. I felt transported by the game

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

49. I felt committed to the game

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

50. I thought I didn't play the game as long as I did

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

51. I felt I had spent less time in the game than I actually had

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

52. I felt that time passed by quicker while playing the game

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

53. I felt bored most of the time

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

54. I felt amused most of the time

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

55. I felt anxious most of the time

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

56. I felt confident most of the time

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

57. I felt thrilled most of the time

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

58. I felt entertained most of the time

0 – 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10 | N.A.

Any comments about your level of immersion? Any "deal-breakers" or improvements?

Note: The numbers on the questions were included for simplicities sake, when referring to the questions in the thesis. The copies the participants answered did not include these numbers.

Comparison of all cognitive factors across three games
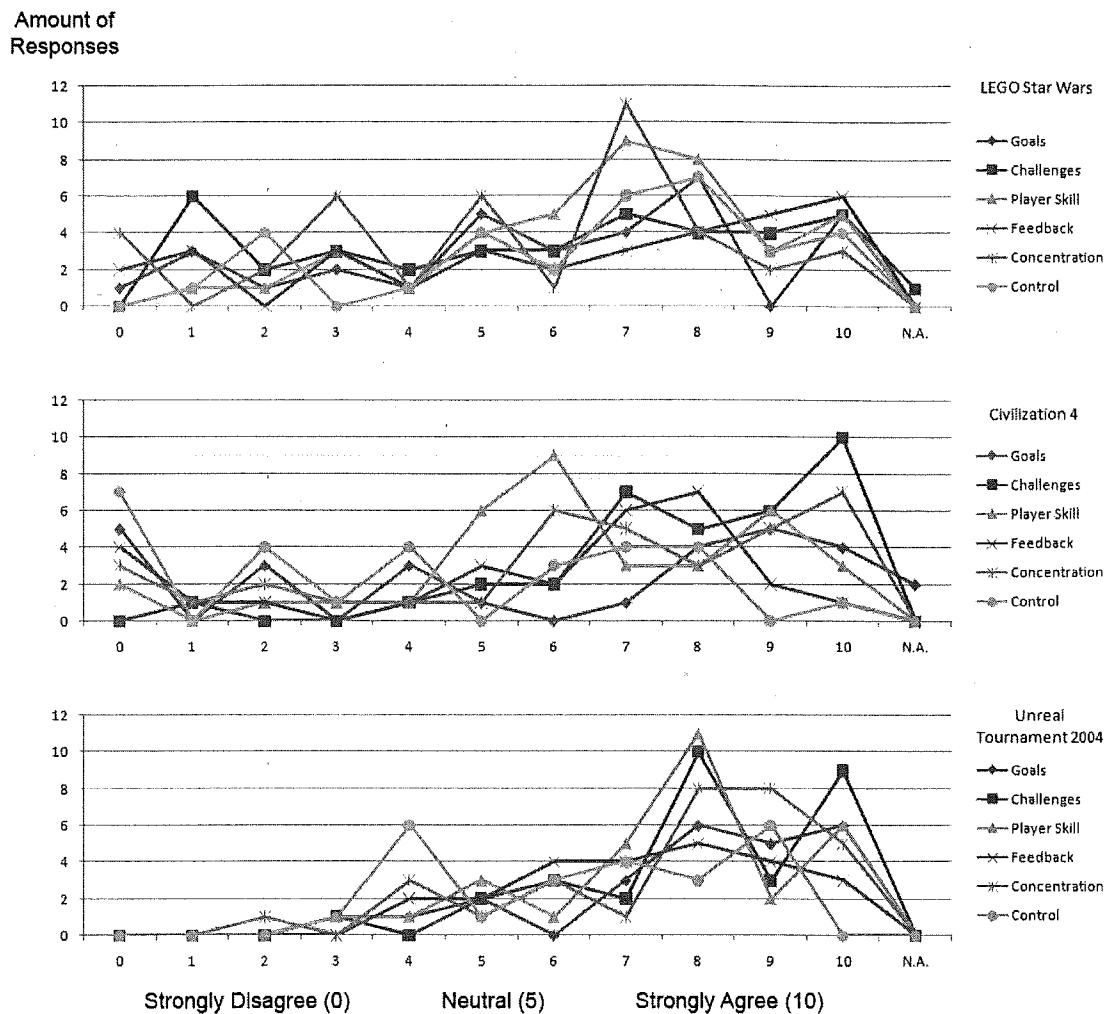
Amount of
Responses

Figure 1. Cognitive Categories Agreement Scale. Shows the amount of responses for all participants across all three questionnaire games. Notice how the participants rated all the cognitive factors in Unreal Tournament evenly across the positive side of the agreement scale, while they rated LEGO Star Wars and Civilization IV cognitive factors across the whole agreement scale, showing no real consensus about their cognitive experience while playing these games. These results were aggregated from the participant's responses from questions 1 to 27 from the questionnaire (Appendix E), which covered all the cognitive factors.
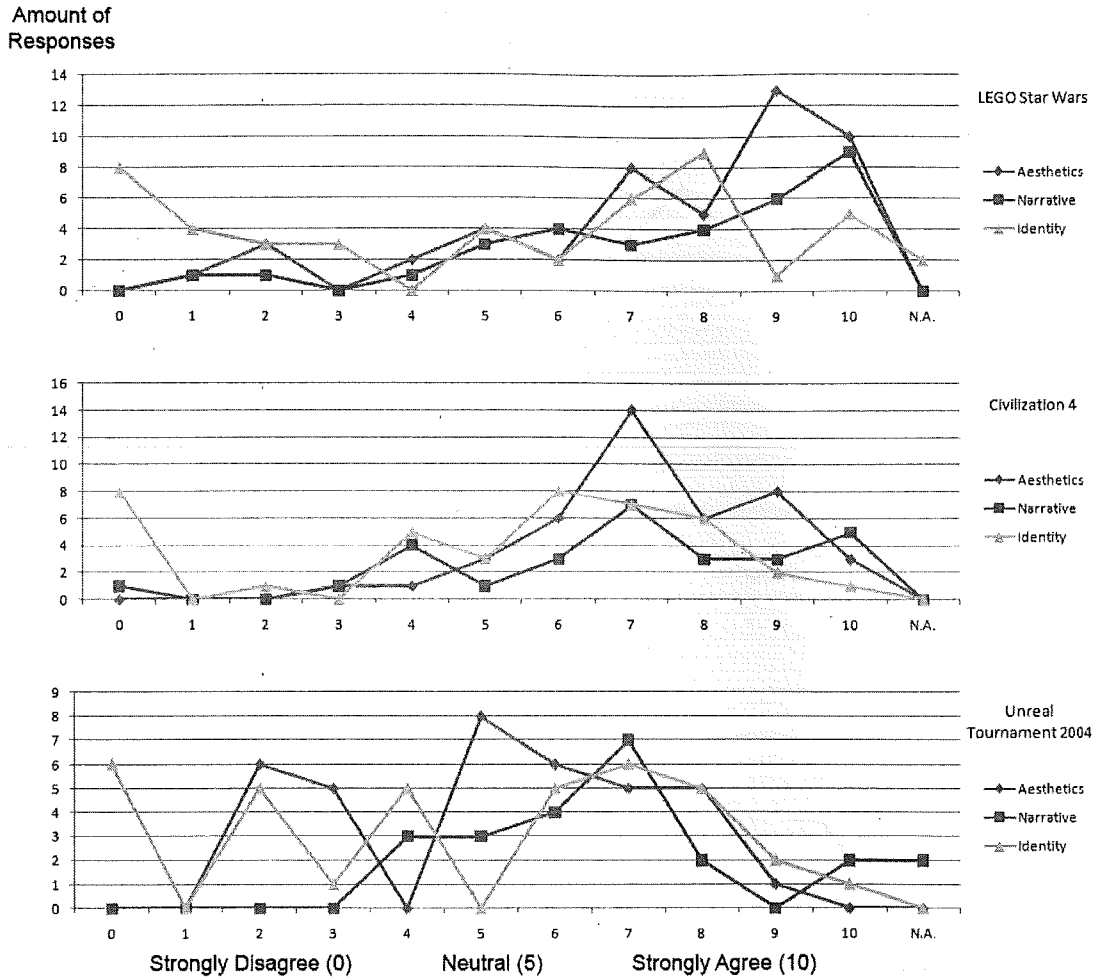
Comparison of all affective factors across three games

Figure 2. Affective Categories Agreement Scale. Shows the amount of responses for all participants across all three questionnaire games. Notice how the participants rated all the affective factors in LEGO Star Wars and Civilization IV evenly across the positive side of the agreement scale, while they rated the affective factors of Unreal Tournament across the whole agreement scale, showing no real consensus about their affective experience while playing the game. Also, all three games suffered from participants not being able to identify with what was happening in the game. These results were aggregated from the participant's responses from questions 28 to 43 from the questionnaire (Appendix E), which covered all the affective factors.

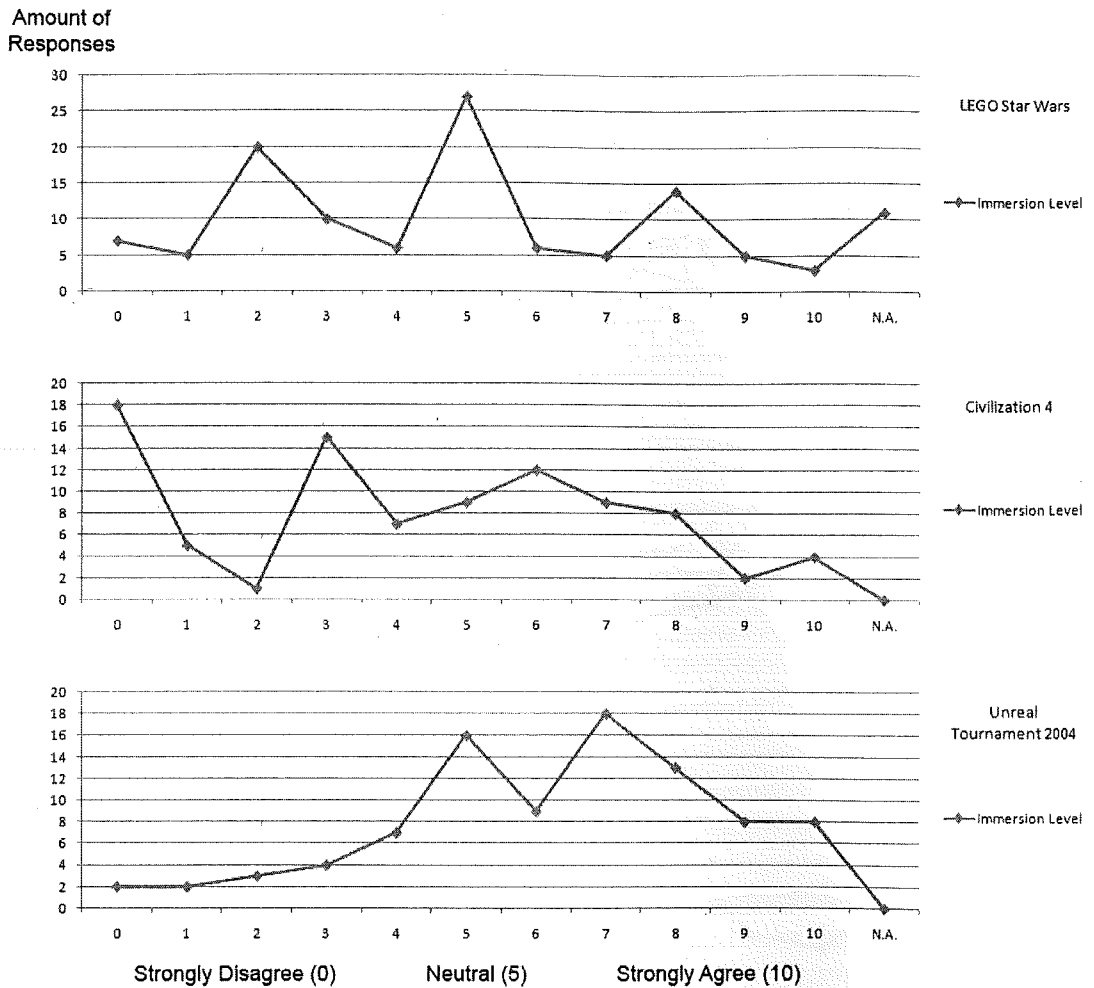# Comparison of the level of immersion across three games

Figure 3. Immersion Level Agreement Scale. Shows the amount of responses for all participants across all three questionnaire games. Notice how most the participants rated their immersion level to be favourable across the agreement scale, while LEGO Star Wars and Civilization struggled to keep the participants immersed, displayed by the ratings covering the whole agreement scale, showing no real consensus among the participants playing those games. These results were aggregated from the participant's responses from questions 44 to 58 from the questionnaire (Appendix E), which covered the level of immersion.

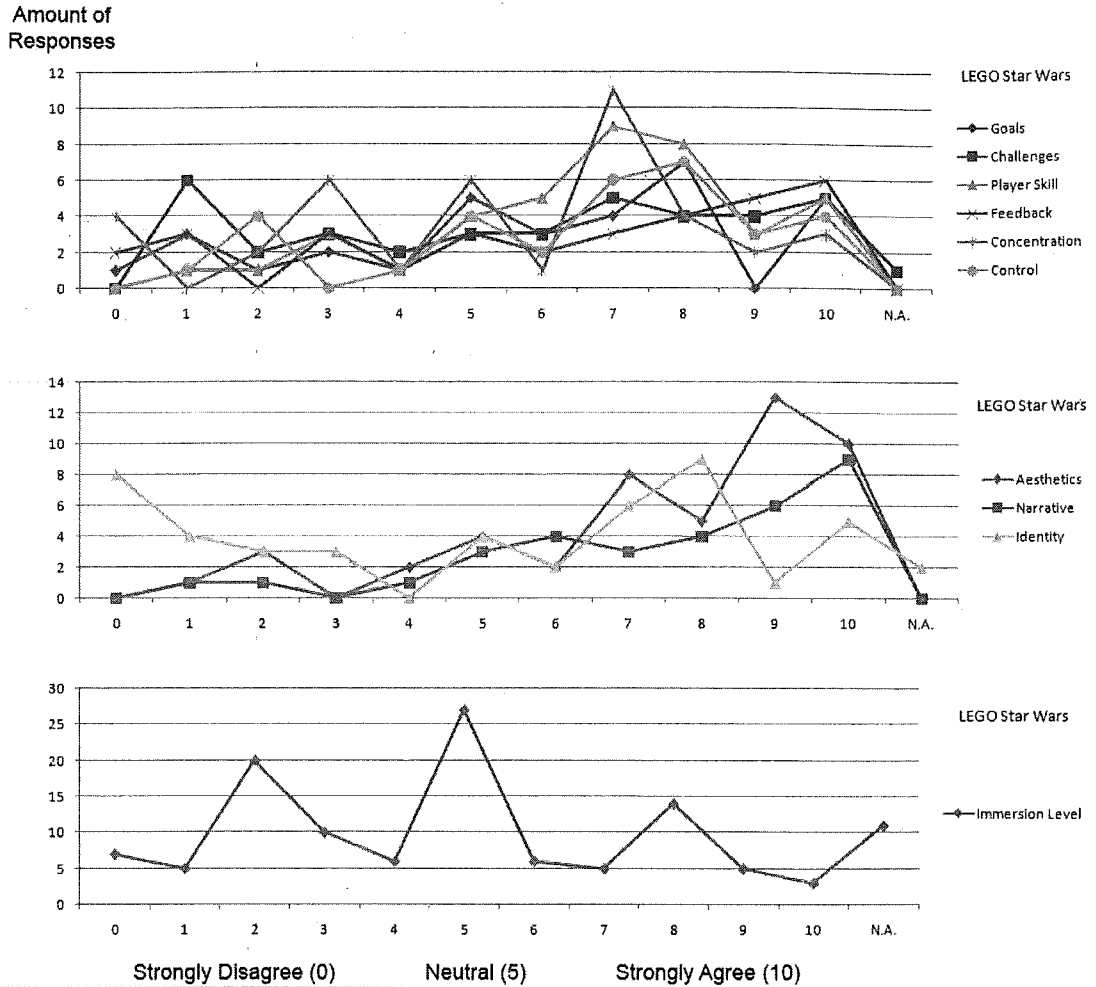# Correlation of all the responses for LEGO Star Wars

Figure 4. LEGO Star Wars Agreement Scale. Shows the amount of responses for all the participants' questionnaire responses for the three categories. These results were aggregated from the participant's responses from questions 1 to 58 from the questionnaire (Appendix E).

Correlation of all the responses for Civilization IV
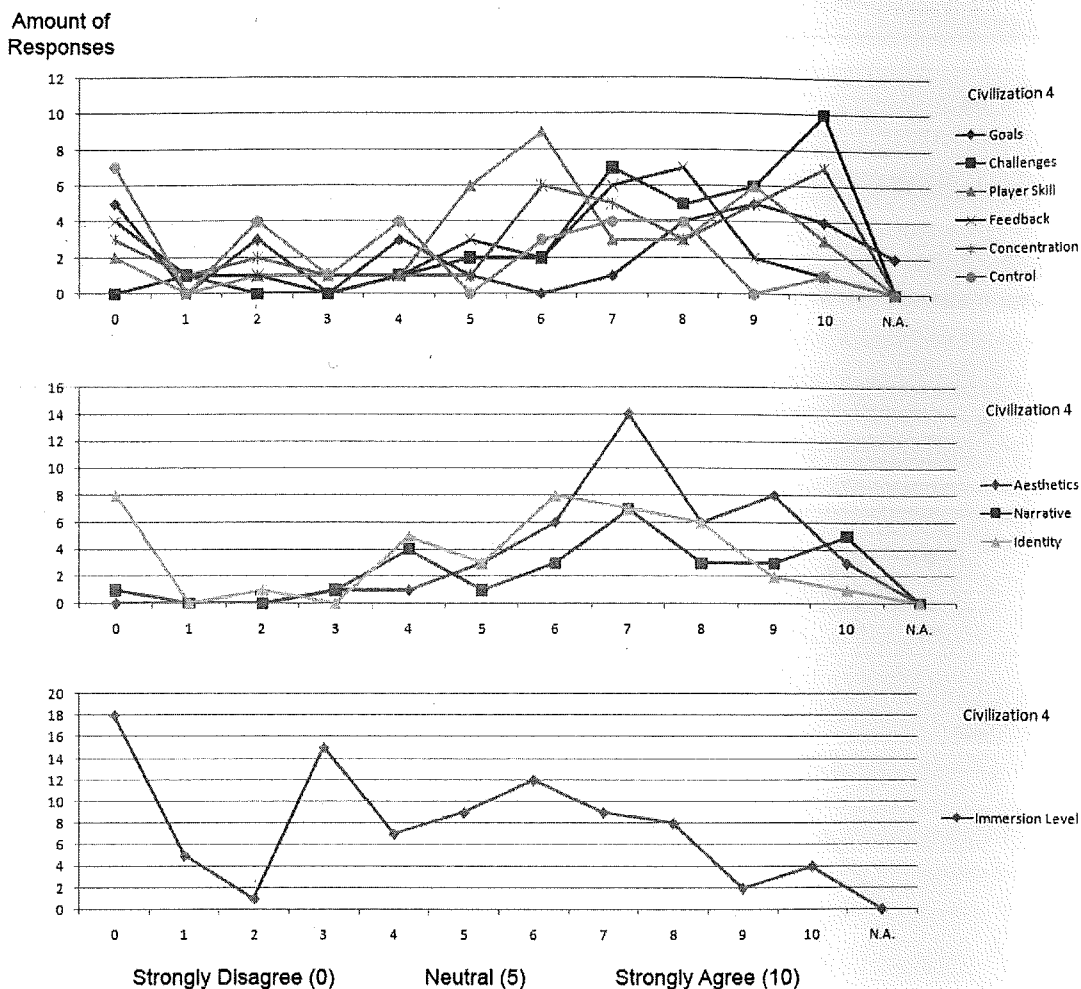
Amount of Responses

Figure 5. Civilization IV Agreement Scale. Shows the amount of responses for all the participants' questionnaire responses for the three categories. These results were aggregated from the participant's responses from questions 1 to 58 from the questionnaire (Appendix E).

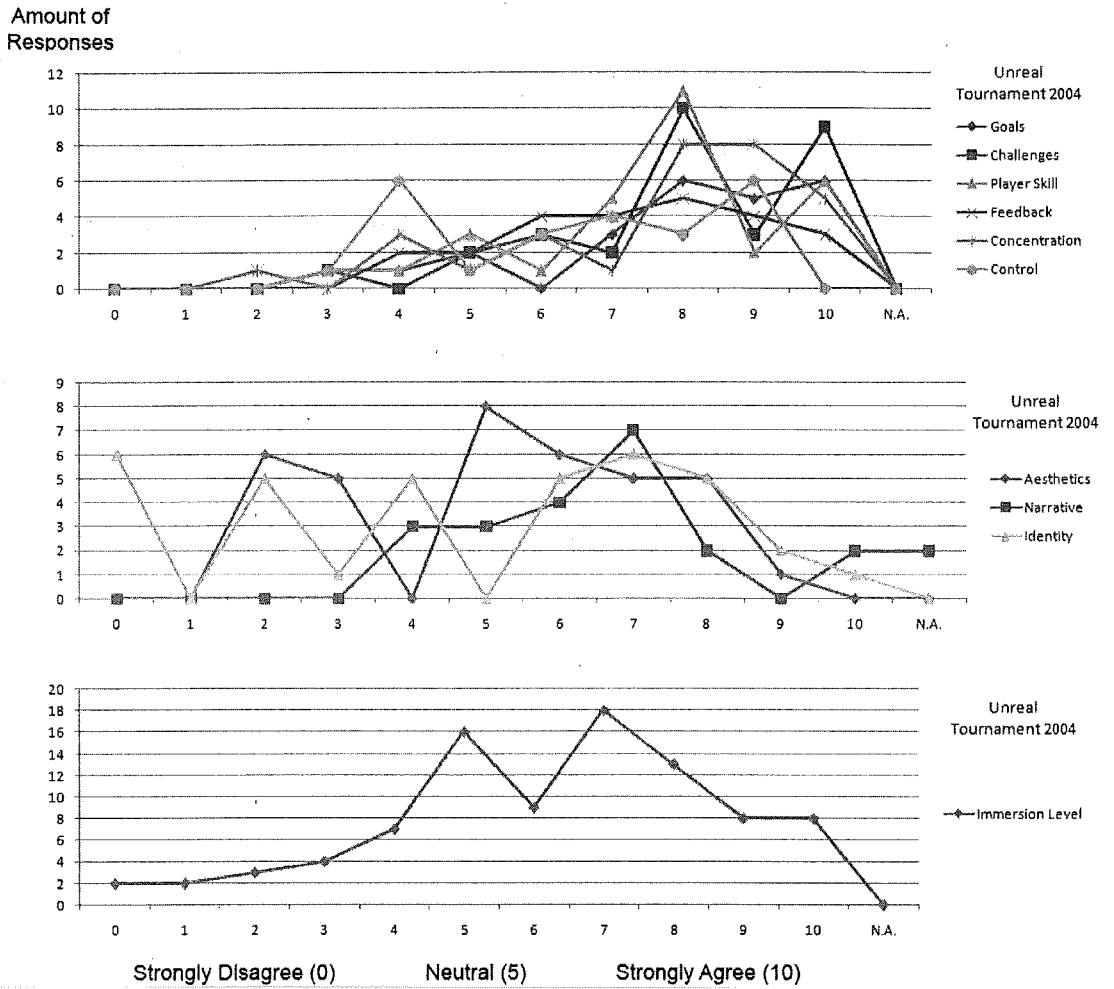# Correlation of all the responses for Unreal Tournament 2004

Figure 6. Unreal Tournament 2004 Agreement Scale. Shows the amount of responses for all the participants' questionnaire responses for the three categories. These results were aggregated from the participant's responses from questions 1 to 58 from the questionnaire (Appendix E).