How Alternate Reality Gaming changes reality

The effects of playing an Alternate Reality Game on reality,

during and beyond game play,

compared to the effects of

playing an Massively Multi-player Online Role Playing Game.

Master thesis Communication Science, track Media psychology

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In 2008 I first came across Alternate Reality Gaming (ARG) in an episode of the popular TV-show *Numb3rs* and I was intrigued. It was a form of gaming that apparently did not stop when it encountered physical reality but made reality part of the game. My search into the concept of ARG's soon led to the introduction of Jane McGonical, an ARG researcher and designer who claims that the next generation of Nobel prize winners will all be gamers (Strickland, 2007). I think she has a point. So I started wondering what would make this type of gaming so different and (hopefully) more suitable to promote the positive. This thesis looks at some of the basic constructs of, what I think, makes ARG's such wonderful gaming environments.

Humanity has always played games. We are ingenious creatures that can create 'make believe' universes out of thin air. What has been, and is continuing to change, is the 'reality' of our make believe universes (Valkenburg, 2006). Connected through internet the entire world is our playground and, as graphics and game design are getting better and better, our make believe universes seem more real. "The kinds of games that seem to draw people in the most, however, and have the deepest effects on their lives are Massively Multi-player Online Role Playing Games..." (Castronova, 2007). These Massively Multi-player Online Role Playing Games (MMORPG) are make believe universes in which real people interact with other real people through digital representations of themselves; millions of people participate in these worlds (Castranova, 2007). Although the effects of MMORPG's may be profound; it is no longer the culmination of media and play. MMORPG's have introduced virtual and social worlds into our living rooms and brought the game realm into our everyday reality but the development did not stop there.

The most advanced blurring of the boundaries between make-believe and reality today is Alternate Reality Games (ARG). This latest form of game play is not just multimedia. Websites, cell phones, public phones, motion pictures, radio, magazines, newspapers and museums have all been used in an ARG (e.g. Hunter, 2008). An ARG is also multi reality; the virtual and the physical reality are combined in a game that has lost some of the boundaries we use to distinguish game play from reality (Baertlein, 2008). Other games are limited in time, space and numbers of players, but an ARG is more ambiguous regarding these aspects "...a game that has one or more salient features that expand the contractual magical circle of play socially, spatially or temporally (Montola, 2005, p. 3)".

At the moment the number of ARG players is small but steadily growing, and it would be prudent to gain more knowledge on the psychological impact of this specific type of game play. This thesis entails descriptive research, making use of both qualitative and quantitative data. The goal is to investigate some of the effects that the overlap between the physical reality and the game reality of an ARG might have. The effect of incorporating the physical reality in an ARG on the game reality will be studied, as well as the effects of playing an ARG on the physical reality. One of the effects that incorporating physical reality might have on the game reality is that the game environment would seem more real. In order to comment on the realness of the game environment and whether this is high or low a comparison is needed. The closest engrossing gaming reality is that of an MMORPG, like an ARG a MMORPG has numerous real players, highly engrossing game play and a (virtual) environment in which the players can move, act and interact (Chan, 2006). These similarities makes MMORPG a likely candidate for comparison. These criteria have lead to the following research question:

How does playing an Alternate Reality Game effect ARG players during and after play, compared to players of a MMORPG?

In comparison with the MMORPG gaming environment it is expected that a higher sense of perceived reality will be found in the ARG gaming environment. One of the effects that playing an ARG might have on physical reality is transference; knowledge and skills learned in the ARG gaming environment may be used in the physical reality and have (positive) effects there. It is expected that since physical reality is already incorporated in the ARG, the transference of learned content into physical reality will be high. Again the comparison will be made between ARG and MMORPG and the effects are expected to be higher involving the ARG gaming environment.

The theoretic framework will start with a discussion reality and the perception of reality. The concept of play in general is then investigated, after which the two types of play that this thesis revolves around will be discussed; ARG and MMORPG. Following the theoretic framework there have been two studies conducted. The first was a qualitative study, consisting of several online interviews. This study was followed by quantitative research; an online survey of which the questions were based on the theoretic framework and the results of the online interviews. As there is currently only a limited amount of research available on the experience and effect of playing an ARG, this thesis aims to further fill this void by applying 'old' knowledge to a new medium.

Game Play and Effects

Reality

Truth is stranger than fiction, but it is because fiction is obliged to stick to possibilities; Truth isn't. (Mark Twain, 1897).

One way to define reality is to approach is as a construct that is built within a social context. Social comparison theory, social proof and shared mental models are three different perspectives that all treat the perception of reality as a social process (Van Swol, 2008). The social comparison perspective has done research on the determination of reality on the basis of a social consensus. By checking individual experiences and their interpretations against the perception of similar others a consensus is established, then every event or opinion can be correctly interpreted based on this consensus (Festinger, 1954 as cited in Van Swol, 2008). The social proof perspective examines how the behaviours of others influence an individual's social reality. A person may accept the behaviour of the majority proving its own justification. since 'everyone' is behaving or believing in a certain way this must be the true and correct way to perceive reality (Sunstein, 2003 as cited in Van Swol, 2008). The perspective of shared mental models approaches the co-creation of reality as a shared view of group processes, norms, and roles that helps coordination and performance. Trough communication a shared model of the situation is build along with how best to perceive it and how to behave accordingly (Roberson, 2006 as cited in Van Swol, 2008). Strong shared mental models have shown to improve task performance (Cannon-Bowers et al. 1993 as cited in Van Swol, 2008).

When we are born we know nothing and accept everything, quite literally anything is possible. When we grow up our view of the world changes from acceptance into expectancy; in our middle to late childhood what we define as real changes from everything that is

possible into the things that are probable or plausible (Shapiro, & Makana Chock, 2003; Van Swol, 2008). Especially in a mediated context, whether or not we perceive things as real becomes more important.

Perceived realism.

Shapiro's research at the turn of the century indicated that people can make judgements about the reality of a media experience on a moment-to-moment basis and that this judgement depends highly on the typicality of the experience (Shapiro, 2003). If it is typical of what is known and expected we are more likely to perceive it as real. Any media experience is compared to personal experience, and the experiences of the people that one is familiar with (Eikelenboom, 2006). "Beyond one's own direct experiences of the world, humans rely on communication to form impressions about the rest of reality" (Kosciki, 2008). The observed behaviour is assessed, personal risk is also assessed and an interpretation of the media is made. Then a judgement is made on the realism of the media experience. The more typical we judge story elements of the media experience, the more likely we are to judge the whole thing as real. Perception might also be viewed as categorization. As Shrum states "…people are always ready to perceive (categorize), and they may do so by choosing among a number of categorization possibilities" (Shrum, 2006, p. 57). Combined with Shapiro's research (2003) this means that people place what they perceive in categories they are familiar with. To make reality-judgements on situations that go beyond actual knowledge, like a dragon filled-fantasy world, imagination is needed (Valkenburg & Peter, 2006). People imagine what the situation would be like IF it were to happen and then judge the realness of the media content based on their expectations (Shapiro, Pena-Herborn, & Hancock, 2006).

Zillmann (2006) questioned whether we need to suspend reality in order to experience the emotion or if we could just believe in the fiction. Research among ARG players reveals that although players believe in the game reality, this is a choice that they are aware of; they play the believe in the game reality (McGonical, 2003). "Simply put, when a person is immersed in pleasurable game play, the mind has no motivation whatsoever to disbelieve any of the information it is receiving" (Castronova, 2007).

The perceived realism of video games depends heavily on the inferential and imaginative elements that the game incorporates as well as the sensory information (Shapiro et.al., 2006). Current video game design focuses on making it look real instead of making the player think it is real. More effort is focussed on the sensory stimulation to enhance realness then to the more abstract and conceptual elements. These conceptual elements are typicality, character type, character judgement and emotion. There are two types of characters in video games; avatars, controlled by humans, and Non Playing Characters (NPC) or bots, controlled by the game system. The interaction with the avatar gives greater meaning and a higher sense of realism then the interaction with a NPC. Although dialogue-protocols are very advanced, an experienced player can easily tell the difference between an avatar and a NPC. Emotions in the game enhance perceived realism if the emotions shown are in line with the expectations of the player (Shapiro et.al., 2006). An avatar is inherently better at showing the correct expected emotion than a NPC, creating a heightened sense of realism.

In several studies of video games (e.g. Anderson and Dill, 2000; Ballard and West, 1996: Calvert and Tan, 1994; Dill and Dill, 1998) evidence is found that the level of perceived reality determines the psychological effects of the game play. The more real it is perceived, the stronger the effects are. If this finding is applied to the gaming environment of

the ARG, it is expected that perceived reality would be higher due to the incorporations of physical reality. This incorporation would make the boundary between the gaming environment and physical reality more vague. Following the aforementioned research results strong effects are expected from an ARG gaming environment.

Because an ARG has a firm link to physical reality, and all the typicality that goes with this, and because the self is involved as a platform by which the player's own expectancies and experiences are incorporated in the game; it is expected that ARG players have a higher perceived realness of the game, compared to MMORPG players. This leads to the following hypothesis:

Hypothesis 1:Perceived realism of the game is higher among ARG players compared to MMORPG players.

Play

Play seems to be something unreal. At first it seems intuitively clear what is meant by play; it is obvious when one is playing and when one is in earnest. The distinction between real and play seems clear, but at closer inspection the concept of play reveals itself to be a complex one. Before a very specific type of game play can be discussed, a definition of play in general must be given. Caillios (1957) defines play as an activity that is essentially free, separate, uncertain, unproductive, governed and make-believe. Meaning that we cannot be forced into play; it is something we undertake by our own choice. If we would be forced, the experience would cease to be play and become an assignment. Furthermore, play is separated from normal day-to-day living. Often this separation is physical; one chalks lines on the ground for hop-scotch to physically limit the playing field or plays a board game on a board and only on this board does the game exist. Play is also separated in time: there is a start and a stop to the

playing. Play also requires some level of uncertainty; will it work, will it be fun, will the audience laugh and of course who will win? If the outcome of the undertaking was certain play would turn into a task. It would be no more than a series of steps to achieve an outcome. The achievement of an outcome must also be absent; the product of play can only be play itself, otherwise it becomes merely a means to an end. To control all the things play must or must not be, play requires rules. Finally, play can never be real. Johan Huizinga sums it up as

> "a free act, that is consciously 'not meant' and outside of normal life, that still might completely absorb the player, to which no direct material interest is connected, or use is gained, that unfolds itself in a purposely set up limited time and space, which adheres to certain rules and order, and brings forth a sense of community, which gladly shrouds itself in secrets or is distinguished from the real world by use of disguise. “(translated from p. 41, Huizinga, 1938).

The definitions of Caillios (1957) and Huizinga (1938) both define play as a domain that is within society yet different from it, a domain which has no merit beyond itself, in which chance is always of influence in a complex structure governing the fantasy of which the domain is created and a domain to which one must enter voluntarily. An important part of play is the interaction; with oneself but often in a social setting. "Playing is always communication" (Ohler, 2008, p. 3638), whether this is intra- or interpersonal communication. These definitions give a solid structure to hold the fuzzy concept of play.

The way we play might differ between cultures but there is not one culture in which play is absent (Huizinga, 1938). We engage in play to fulfil a number of basic human needs. Based on Self Determination Theory, Ryan and Deci (2000) attribute three fundamental needs to every human being; a need for competence, a need for autonomy and a need for

relatedness. When these needs are met psychological well-being is heightened and self-motivation is increased. By playing these needs can be met. The need for competence is fulfilled by a task not too challenging but not too simple so one can feel competent, which relates to the concept of flow (Csikszentmihalyi, 1990). The need for autonomy is met by one of the 'ground rules' of play; that it is voluntarily. The player autonomously decides to play. The relatedness we find in the social aspects of play, most playing is done in a social interaction. Be it between several players, between a player and an audience or between a player and a mediated character.

"Play is a credible developmental and evolutionary antecedent to the more sophisticated forms of entertainment we engage in today" (Vorderer, Steen, & Chan, 2006, p. 13). One of the more sophisticated forms of play that we engage in today is interactive gaming. Gamers are a different type of media audience: Contrary to most audiences, they are active. For the TV, radio or newspaper audience communication is mostly one-way and the users are passively on the receiving end of the medium (Katz, 1962). Games are a fixed part of the media landscape that we move in today; "...[games] are now considered main stream media, competing with newspapers, television, radio, and film for attention and dollars" (Williams, 2006, p. 199). Gamers and internet users search and demand content specific to their needs, interacting and possibly adapting it as they see fit. Creation of new content is also high among gamers. For example, almost a quarter of the popular MMORPG *Everquest* players had created their own artwork or fiction based on or around the game play (Griffiths, 2003). Concepts such as curiosity, surprise and suspense work very different in interactive video games compared to other media entertainment and therefore most media enjoyment theories are not directly applicable to interactive gaming (Grodal, 2000). A likely more

suitable perspective on the investigation of interactive media is a play-perspective; "The analysis of interactive media entertainment especially can be based on a play frame (Ohler, 2008, p. 3639)".

The way we interact with media and shape them to our own personal needs is reminiscent of the way we play; creating our own universe in which we can move. These universes exist within our reality, yet are parallel to it. They are part of our reality and at the same time we do not consider them to be 'real'. Some of our play does not happen parallel to our reality but uses reality as it is in a different way. This reinterpretation of reality is at the core of an ARG.

Alternate Reality Game

The six key qualities that describe an ARG are cross-media, pervasive, persistent, collaborative, constructive and expressive (McGonical, 2004). *Cross-media* refers to the several media platforms that are used simultaneously in the game play. All possible media have been used in an ARG but internet is usually the central binding medium. The *pervasive* quality is found in the fact that an ARG uses the real world as part of the narrative it wants to tell. Part of the game play takes place in the physical reality and several game clues are embedded in everyday environments. *Persistence* means that the game play is continuous, 24 hours a day, 7 days a week. For the individual player this means that game play continues without the player being present. *Collaboration* is required because ARG's "would be absolutely *impossible* to solve alone" (McGonigal, 2005). It incorporates massive scale challenges and location-specific information, from multiple locations. The *constructive* quality refers to the absence of a player platform, this needs to be created by and for the players. The organisation of communities and social engineering are needed, but not pre-

made, to maintain game play. A final determining quality is being *expressive*; an ARG " requires and inspires user self expression" (McGonigal, 2004). User created content, fan art and fan fiction are an integrated part of the game play. A striking feature of an ARG is that players do not use a representation to interact with the game. A player does not create an avatar, does not build a virtual space for a virtual presence but utilises actual presence directly in the game play. The players' lives are the platform. Multiple media and gaming elements are involved and the players have impact on the storyline, making the narrative an interactive one. The story develops real-time and player's often work together, coordinating real-life and online activities. Real life knowledge, that not everyone might have, is required to solve clues and puzzles.

The ARG *The Beast* has been claimed to be the game that successfully introduced ARG's to a larger public (Baertlein, 2008). This murder-mystery in a future setting intrigued players for 12 weeks in 2001. It was created as a promotion for the movie *A.I.* An example of a smaller ARG is *Chain Factor* (Montola, Stenros & Waern, 2009). This puzzle based ARG started in the *Numb3rs* episode *Primacy* (aired first November 9th, 2007) in which players needed to find and crack several codes to stop the world's economy from being destroyed. The *Primacy* episode featured short commercials to lure players to start playing at www.chainfactor.com, see Figure 1 for a screenshot of the website. As you can see in Figure 1 the game starts off with a fairly simple puzzle-game. Further game play included several clues and codes embedded in the *Primacy* episode. and clues in physical locations, see Figure 2 for an example. Other codes that unlocked 'cheats' could be found on billboards throughout the country. On December 12, 2007 the game was successfully ended by entering all

'ShutdownKeys' simultaneously on twelve specific computers in twelve different (physical) locations (Dena, 2008).

Figure 1

Screen shot of the puzzle-based ARG Chain factor website

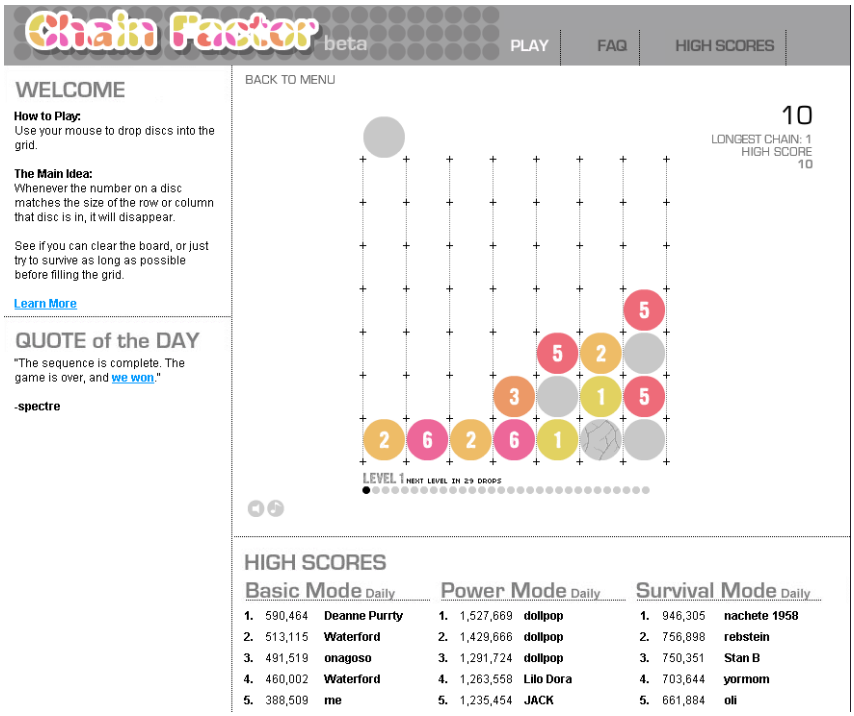
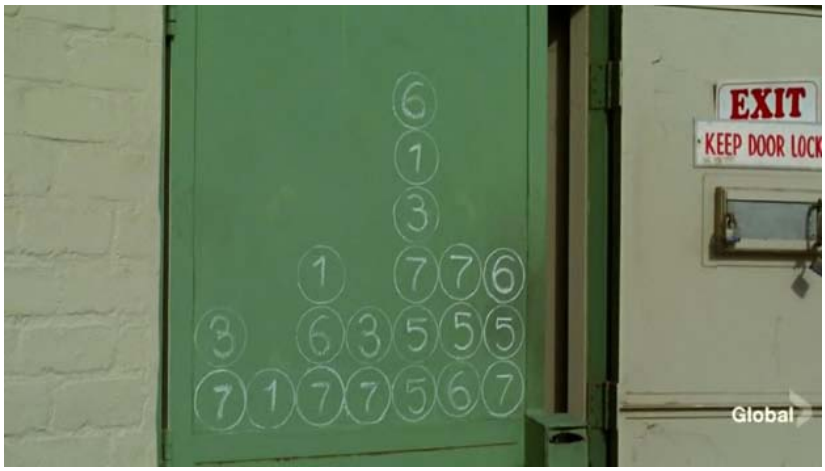


Figure 2

Chain factor clue on physical locations



An ARG of another magnitude is *I Love Bees* (aka Haunted Apiary) which was designed to support the launch of the video game *Halo2* in 2004 (McGonical, 2007). The ARG revolved around an audio-drama broadcasted by public phones, immersing the player base into the world of *Halo2*. "The distributed fiction of *I Love Bees* was designed as a kind of investigative playground, in which players could collect, assemble and interpret thousands of different story pieces related to the *Halo* universe. By reconstructing and making sense of the fragmented fiction, the fans would collaboratively author a narrative bridge between the first *Halo video game* and its sequel" (McGonigal, 2007). It had almost 10.000 people participating in real world challenges, and over 3 million players overall. The core website www.Ilovebees.com received 80 million hits, of which over 250.000 were received on the first day it went online. In the four months that the ARG ran, over 40.000 public phones spread over 50 states and 8 countries were answered (Dena, 2008). The players also had to learn a fictional program language called Flea++, in order to complete the online challenges (McGonigal, 2004). The game created enormous media coverage with items in the New York Times, CNN, Wired and the London Times to name but a few. It also received the Innovation Award at the Game Developers Choice Awards 2005 (Dena, 2008).

Any ARG has several key ingredients such as a puppet master, a rabbit hole, a curtain and TING rhetoric (McGonical, 2003, Montola, 2005). A *puppet master* is the person controlling the game, giving out clues and keeping an eye on plot development. The starting point of an ARG is known as a *trail head* or a *rabbit hole*, the latter is a reference to Alice in Wonderland “In another moment down went Alice [into the rabbit hole] never once considering how in the world she was going to get out of it” (Carrol, 1865, p.18), usually this starting point is a website. The *curtain* marks the separation between the players and the

puppet masters, it refers to the curtain of a magician; if you look behind it you will know how the trick works. An ARG treats itself as if it were real; all physical things used by the puppet master should exist and be functional and there is no overtly present rule set or designated arena. All evidence of the game being a game is buried and the elements incorporated in the game have to be non-fictional but actual. This pattern of the game denying it is a game is known as the *This Is Not a Game* or *TING rhetoric* (McGonical, 2003; Montola, 2005). Elan Lee, lead game designer of the 'first' ARG *The Beast* comments;

> "Players were never meant to believe the This Is Not a Game rhetoric... it was obviously a game. There was nothing we could do about that. What we could do was make it a game with an identity crisis. If I know it's a game and you know it's a game, but IT doesn't know it's a game, then we've got a conflict." (McGonical, 2003, p. 10).

Players hold on to this rhetoric and actually protect it by ignoring possible cracks where reality seeps through at places where the curtain is slightly lifted (Stenros, Montola, Waern, & Jonsson, 2007). Players do not want to look behind the curtain; they go along with the game believing itself, but the awareness of the game-as-game remains.

ARG's are part of the pervasive gaming genre which is "a genre of gaming systematically blurring and breaking the traditional boundaries of a game" (Montola, 2005, p. 1). Expansion of a game beyond its boundaries in spatial, temporal and social dimensions in itself is not new but "pervasive gaming is differentiated with the use of these expansions in new efficient ways to produce new kinds of game play experiences" (Montola, 2005, p. 1). McGonical (2003) defines different types of play further by making a distinction between pervasive play and immersive play. Pervasive play consist of mixed reality games that use mobile, omnipresent and embedded digital technologies to create virtual playing fields in

everyday spaces. Immersive play is a form of pervasive play that adds the TING rhetoric to the mix. Immersive gaming was designed to "integrate itself fully into the off-line lives of its players" (McGonical, 2003, p. 6). The game achieves this by using everyday digital devices. So no special toys, consoles or joysticks but the phones, fax machines, PDA's and internet connections that the players already had were now part of the game. For example *The Beast*, intrigued their one million player base by contacting them at home or at work, sending e-mails from their own accounts, sending them packages in the mail and spreading over 4000 digital files over various websites (Dena, 2008). For the players *The Beast* was everywhere and anything could be a potential clue.

An ARG can be more than just fun. The first large 'serious' ARG was the *World Without Oil* that ran in 2007. The game revolved around the personal experiences of the players in a fictional, but realistic, global oil crisis. More than 1.500 player reports describing how they interacted with this 'crisis' have been posted online. These reports include blogs, video files, audio files, images and voice mails. Almost 2.000 players registered at the core website www.worldwithoutoil.org, mostly players from the United States. The game was played between the April 30th and June 1st .When the game concluded the website had received more than 60.000 unique visitors. The game received several awards, and a lesson plan for high school teachers to use the content created by the game is in the making (Dena, 2008).

Massively Multi player Online Role Playing Game

Millions of people interact online through an avatar in a virtual world; together they are playing a game genre known as MMORPG. Massively Multi player stands for the amount of people that can simultaneously take part in the game. Online refers the location of the game, it

is played "on and over the internet" (Chan, 2006, p. 77) and Role Playing Game is the game genre where the character or avatar you play is the most important part of the game play; the role you play *is* the game.

MMORPG virtual worlds like the fantasy realm *World of Warcraft* (11 million players in October 2008 (Blizzard, 2008)), and the science-fiction universe *EVE online* (300.000 active subscribers in May 2009 (CCP, 2009)) are large and growing. "A conservative total estimate of actual users [of virtual worlds] would be 20 million; 30 million is probably more accurate (Castronova, 2007, p. 34)". MMORPG players are 89% male, their average age is 26.7 years old and on average they spend 24 hours a week playing their game (Yee, 2009). This type of engrossing game play attracts the more heavy players; in a study of the MMORPG *Everquest* a quarter of the sample group played for more than 41 hours a week (Griffiths, 2003) .

The key qualities of any MMORPG are persistence, physicality, social interaction, avatar-mediated play, vertical game play and perpetuity (Chan, 2006). Both the virtual world and the avatar are persistent meaning that they exist without stop or pause, even without the individual player present. The continuity of an avatar creates a persistent identity which allows for communication and social interaction on a deeper level. Physicality refers to the similarity of the virtual world to the physical world, avatars still have to open doors or walk to places, things usually fall down instead of up or sideways and so on. The virtual reality is largely similar to the physical laws and manifestations of the physical reality. Social interaction is another important aspect of a MMORPG that initially a lot of scholars were worried about; playing a MMORPG would turn players into isolated humans with only shallow online interactions. Recent research (Wellman, 2001) has shown that this is not the

case but that playing a MMORPG increases social capital. One *EVE*-player comments "EVE is also just a chat room with a really good graphic interface" (personal interview). People are social creatures and enjoy interacting with other players, whether this is in a competitive or a cooperative way. Avatar-mediated play entails a representation of the self that exists in the game environment. In Role Playing Games the emphasis is more on the avatar then it would be in a shoot-em-up for example. The avatar, or character, is not just a visual representation but it has skills that need to be developed, it belongs to a certain race or group which gives him/her the features that go with it. The choices made by the player in 'character creation' determine for a large part how the virtual world will interact with it. An example of such choices are shown in Figure 3.

Figure 3

Screen shot of character creation in World of Warcraft

The last key features are vertical game play and perpetuity; meaning that there is no real end goal and a step-by-step way to get there. Virtual worlds are "created through social experiences and players interaction" (Chan, 2006, p. 87). The play is in avatar development. An avatar progresses due to attributes, there is no 'high-score' to be achieved but the quality of an avatar is determined by its level in the game, the gear or equipment they posses and how much wealth they have. Apart from this, avatars that have been in the game environment for a while will also have a certain reputation with other avatars based on former interactions. The reputation of a guild, corporation or family in the virtual world might also be transferred onto the avatar.

Some think these virtual worlds have already begun to change the physical world and real economy as more and more people spend time in these virtual realities. This migration into the more comfortable virtual world will effect both the 'country of origin' being physical reality and the 'destination country' being the virtual reality. This migration is not a physical one but more a migration of attention (Castronova, 2007).

Learning from play

According to Caillois (1957) there are two ways of looking at games culturally. One can see play as derived from adult life, where the ‘leftovers’ of the adult world become items of play and adult life is mimicked by children in various games. A more evolutionary perspective is to look at play as a cultural transference, play as practice in which skills are trained and values are taught (Caillois, 1957). With this, one might also take a more Darwinian perspective; technology is a great and growing part of our lives, social and material success might depend greatly on ones technical knowledge and capabilities, making the person more technically skilled the ‘strong survivor’. It could be argued that advanced gamers are the strong survivors

of the information age, they are technically and socially skilled and use these skills in a creative way seemingly just for their own pleasure. The creative intelligence required in play may be seen as a sexual fitness indicator (Miller, 2000 in Ohler, 2008) because play would make one more adaptable, it promotes the capability to make new connections thus making the best player the more attractive mate. This could offer an explanation why playing does not necessarily end at the start of adulthood; play enhances sexual attraction. This evolutionary perspective is based on the assumption of learning from play.

Figure 4

General Learning Model; simplified view. Adapted version of Buckley, 2006.

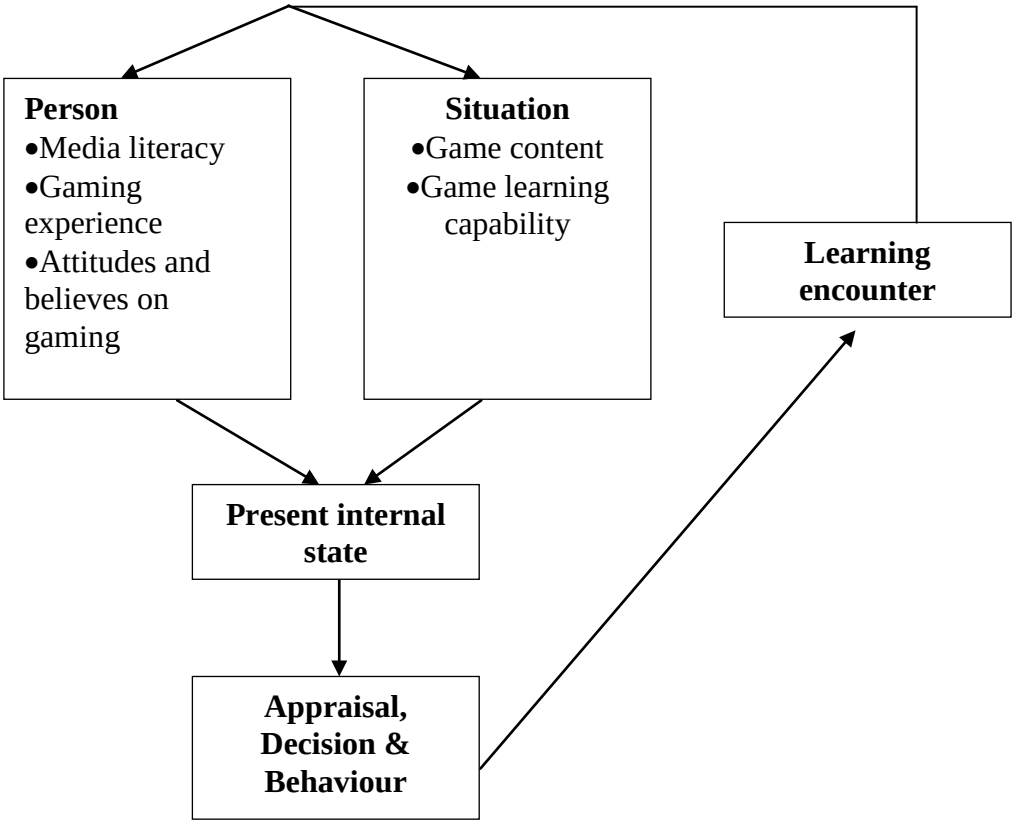


Figure 4 gives a simple representation of the factors that influence learning, adapted to a gaming environment. In general, the person we are and the situation we are in determines

our present internal state which in turn influences the process of appraisal, decision and consequent behaviour we go through. From this process we gain experience which can be viewed as a learning encounter. What we take from this learning encounter is absorbed into the appropriate knowledge structure, thereby changing who we are and possibly how we view the situation we are in. There is no natural end to this, learning is an ongoing process of adaptation. When we apply the model to learning from gaming specifically, the personal factors would be media literacy and former gaming experiences along with attitudes and believes towards gaming. The situational factors would be the ability to learn from games and the game content; factual recall or simulations (this includes role-play) of reality (Buckley, 2006).

The potential of video games as a teaching tool was discovered by scholars in 1980's and several studies have been done since. They show that video games make good teachers for various reasons; they get your attention, they teach the attitudes necessary for successful behaviour, the enable people to feel competent about performing a task, they are motivating, they require active participation instead of passive watching, they demonstrate all the necessary steps to perform a behaviour or series of behaviours and they allow for repetitive practising (Anderson & Dill, 2000; Gentile & Anderson, 2003; Kozma, 1991; Krendl & Liebermann, 1988 in Buckley, 2006). One successful example is the United States Marine Corps, which took the advantages of learning from play in a video game to heart and adapted the first-person-shooter *Doom* into *Marine Doom* (Prennsky, 2001 in Buckley, 2006). They used this video game to learn about teamwork, communication and the concepts of command and control. Games also provide clear winning and losing, they simplify the complex structure of everyday life (Castronova, 2007). These positive effects that enhance learning do

not depend on the video game but on the principles and attractiveness of play that is embedded in the video game. “[It is] plausible to make a tentative proposal that it might be the pure characteristics of the game, not the medium of computer, that makes the learning process of computer-game based education more effective” (Lee, 2006, p. 338).

According to social cognitive theory, social learning entails that people can learn from behaviour, be it their own experience or the observed behaviour of others. This can easily be applied to learning from the interactions in a video game; “People can learn many complicated behaviours, attitudes, expectations, beliefs and perceptual schemata through observation and participation in video games” (Buckley, 2006, p. 368). It is proposed that video games can teach whatever concepts are repeatedly rehearsed within them.

Game experience into real application

"Considerable empirical evidence supports the claim that cognitive skill [such as proactive and recursive thinking, systematic organization of information, interpretation of visual information, general search heuristics, means-end analysis and so forth] obtained in playing computer games can be transferable to other tasks" (Lee & Peng, 2006, p. 334). The knowledge or skills a player learns within the game environment can be taken outside of this environment and applied to physical reality. Within gaming environments research has primarily been done at what effects different video games might have on the player beyond the game environment. A summary of the findings are displayed in Table 1 below.

Table 1

The effects of playing a video game (Lee, 2006)

	Consequences (effects)	
	Negative effects	Positive effects
Violence entertainment games	Affect (hostility, anxiety) Aggressive behaviour Arousal Empathy towards others Physiological responses (heart rate, blood pressure, skin conductance) Priming of aggressive thoughts Pro social behaviour	Catharsis
Non-violent entertainment games	Addiction or game dependency Gender stereotyping Physical health problems	Training Sociability Academic performance Therapy Spatial visualization Cognitive abilities
Educational games		Learning Motivation Retention memory Utility for special groups (attention-deficit children, patients)

A research area of great concern and interest is the area of violent entertainment games and especially the effects these might have on children. There are a lot of mixed results on the negative effects of violent entertainment games; the most consistent effect is found on aggressive thought. Playing violent video games heightens the accessibility to aggressive thoughts. Among the negative effects of entertainment games in general, addiction is often mentioned but research so far does not provide a consistent report providing proof for the game-addiction hypothesis. Any physical health problems derived from playing video games are mostly associated with the amount of time spent sitting behind a computer screen and thereby not exercising (Lee, 2006).

Virtual worlds are dominated by a massive amount of male characters that are mostly hypermasculinized. The few female characters present are usually the victim or the 'fair maiden' in need of rescue. Gender stereotyping is overtly present in video games, which leads to gender stereotyping by players of video games. This pattern of media content leading to certain beliefs is consistent with cultivation theory. Cultivation theory argues that repeated exposure to the same messages produces "the teaching of a common world-view, common roles, and common values" (Severin & Tankard, 2001). This theory was first applied to the effects of watching television but it seems likely that the same effects might be expected from other media, such as games. Content that is repeatedly shown and/or practised within a gaming environment is likely to produce a common world-view. Therefore, behaviour content experienced within the game environment should drive expectancies of behaviour outside of the game environment. As an ARG environment already has one foot in every day life, cultivation effects are expected to be higher for ARG players. These considerations lead to the following hypothesis.

Hypothesis 2: Cultivation effects of game content is higher among ARG players compared to MMORPG players.

There are several positive effects of playing video games such as training; video games seem to be especially suited to facilitate spatial skills and to enhance cognitive abilities which can be applied outside the game environment. On the increased academic performance research findings are mixed, although excessive play seems to have a negative effect. Sociability is mostly enhanced by playing video games, and in therapy video games have proven to be helpful in a very wide range of psychological and physical therapeutic applications. However, there is still a gap in the scientific literature where research on the

nature of game experience should be; what do users actually experience while playing? (Lee, 2006).

As the above shows that a video game environment can have a multitude of effects on the players reality, scant research has been done on the transference that a MMORPG or an ARG environment might have beyond game play. One might learn new social group behaviour in any MMORPG and then apply this new skill in face-to-face encounters. McGonigal said: "as any puppet master will tell you, even in a real game, the audience is always already responsible for its own immersive experience. It is a small leap for a player to make, therefore, from crafting play out of a game to creating a real little game out of everyday life" (McGonical, 2003, “Gaming reality” para. 10) . Meaning that it is also possible to take not just the skills learned or information acquired but to take the entire ‘play-frame’ and apply that to physical reality in day-to-day life. As ARG’s incorporate physical reality it is expected that players will easily take the play-frame, or new game-perspective, into their own lives. That the game-experience will change their experience of their day-to-day lives. After ARG-designer Elan Lee took part in the pervasive *Go Game* she said "The Go Game confirmed a lot of what I suspected and tried to deliver in the Beast, which is that the best games make you more suspicious of, more attentive to, the world around you. They make you seek out the pieces of something you're already part of. But first they must make you part of it" (McGonical, 2003, “Gaming reality” para. 9)

As ARG players have a more immersive experience then MMORPG players it is expected that they acquire skills more intently and therefore ARG players have a higher transference into their real life compared to MMORPG players. As stated before, games can teach regardless of content, so the number of possible learning encounters is overwhelming.

To give hold in this vastness of options Kraiger, Ford and Salas (1993) summarised the possible learning outcomes into three categories; skill-based, cognitive and affective outcomes.

Skill-based learning spans any outcome that results in, or improves, a technical or motor skill. Cognitive learning results are knowledge achievements and can be subdivided into three categories. The first subcategory is declarative knowledge; factual knowledge of the world, i.e. how many penguins live on the south pole. A second subcategory is procedural knowledge; knowing how to apply knowledge in order to perform a task, i.e. being able to fit a round object through a square hole. The final subcategory of cognitive learning results is strategic knowledge; knowing how to apply the principal of the learned content to a different context, i.e. applying game-heuristics to a calculus problem. The third category consists of affective outcomes, which "include feelings of confidence, self-efficacy, attitudes, preferences, and disposition." (Garris, Ahlers & Driskell, 2002, p. 457) and represents how we feel about something.

In this thesis a closer look will be taken at strategic knowledge as this subcategory of cognitive learning results provides the clearest bridge for transference between the game reality and the physical reality. Strategic knowledge is a type of learning that is regardless of content (Garris, Ahlers & Driskell, 2002), making it very suitable to switch from a gaming environment and the real world. This reasoning leads to a third hypothesis:

> *Hypothesis 3: Transfer of strategic knowledge experienced within the game environment into the real world is stronger among ARG players compared to MMORPG players.*

Research

Study 1: Interviews

Qualitative interviews were held with MMORPG and ARG players that were meant to be indicative of subject matter and players experiences. Interviews were undertaken to ask gamers about their experiences while playing, their reflections on game play in general and to compare experiences in the MMORPG and ARG environments. The interviews were meant to be indicative of the kind of transference players could get from their gaming environments. A starting point was needed to indicate examples of strategic knowledge that could be utilized in the following survey. Several interviews were held in two waves.

Method.

Participants.

In the first wave of interviews there were seven participants; all MMORPG-players, six Dutch and one Swedish. In the second wave, four new interviews were taken after one month of recurring prompting at several online locations. There was one ARG participant; a male from the United States of America, web master of a large ARG-website, 25 years old and a full-time student. Three MMORPG-players participated; one male 26 years old student from the Netherlands, one 67 year old retired female from the United States of America and one 28 year old male nurse aid from Slovenia.

Procedure.

In the first seven MMORPG interviews participants were found mostly through the network of the researcher. In the interviews open-ended, yet direct questions (e.g. What has playing this game changed for you ?) were asked that produced defensive responses instead of informative answers ; “I behave the same way online as I do off-line” and “ it is just a game,

it did not change my life". Also, the medium of the interview differed between interviews making a comparison harder: Skype, MSN messenger audio only, MSN messenger video call and face-to-face interviewing were all used. The interview questions were proven to be too direct and the data of the first interviews has not been used in further analysis. However, through these interviews it became clear that learning from a game has the stigma of the 'autistic gamer'. Someone who is interacting with virtual friends because they have no other, and is socially inapt to such a degree that he or she needs a virtual environment to practice social skills which one is unable to use in the real world. "If you are a social wreck, you could learn something in here because there is a high amount of social control and interaction. More than on the streets outside " and "it did not have any radical effects on me, I already was a socially capable person". The gamers themselves carry this stereotype of the 'autistic gamer'.

A new procedure and a new set of less direct interview questions was set up for a second wave of interviews. The new interview consisted of associative keywords (e.g. sunshine, play, virtual), content mapping questions (e.g. Please explain to me what an ARG/MMORPG is ?), and a memory exercise (e.g. Please close your eyes and imagine yourself when you were last playing: Can you tell me what you experience?) along with several probes and follow-up questions (Evers, 2007). The participants were also asked if they considered the core narrative of the game to be plausible as an actual occurrence. For the full list of interview questions, see the Appendix. Participants for this second wave of interviews were recruited via online gaming boards, both MMORPG and ARG, and through several chat channels, with very limited success. The interviewing was consistently done online in the virtual research environment called EVO; the collaboration network of Caltech University. This virtual environment allowed for a live video and audio stream that could be recorded.

Because a fair amount of knowledge on the topic already exists, the interview could be designed as a structured interview; asking open questions to fill in the gaps in the present knowledge. Due to the high level of social desirability the interviews were only held on an individual basis. The virtual interview setting solved the displacement problem. With the help of live audio and video streams the interview approached a face-to-face interview as much as possible and allowed more room for flexibility (Baarda, 2005). All the interviews were held in English.

Discussion interviews.

When the MMORPG participants were asked to explain what a MMORPG is they all included the social aspect; interacting with other people on a global level, they also mentioned going beyond the limitations of their day-to-day lives. As one MMORPG-player puts it “it is not real but [it] makes you feel more important”. The ARG-player focused more on the several types of media used and the interactive narrative to define ARG’s. When asked what influence the game play had on their lives the MMORPG-players mentioned enjoyment, a more active media usage compared to watching television, more and broader social interactions and being able to relax after a stressful day. From the game environment one MMORPG player also learned to be “a bit more conscious about how I behave”, another MMORPG player really enjoyed the clustering “most people that play these games have high IQ’s…this is harder to find in real life“ and getting to know different people with different lifestyles was also mentioned as a positive encounter in the gaming environment. Most of the participants have made friends within the gaming environment and for all the participants, some of these friendships have moved beyond the game environment. One MMORPG-player spoke of an ongoing online friendship of nine years with two gamers on different continents;

as a trio they have migrated through several online gaming worlds over the past decade. The ARG-player said the strongest influence that playing the game had on his real life was “looking around how things could be used differently”.

Both the ARG and the MMORPG participants stated that they “often”, “absolutely” or “sometimes” played for a longer period of time than they set out to do. The ARG participant stated that “sometimes I will get really involved [...] 'loose' an hour or two”. This indicates a state of immersion, or even flow (Csikszentmihalyi,1990).

Several statements referred to strategic knowledge such as “have to cooperate for success” and “some things you want to do by yourself, some things you need other people for it”. Another player mentioned “you have to think on your feet” as an in-game adagio. “People are really helpful and friendly which is more complicated in real life” was also stated as an important in-game experience. These statements indicated specific strategic knowledge that was experienced while in the game environment.

Study 2: Online Survey

The findings of the interviews were guiding in creating several strategic knowledge statements, which were used in the survey to test both the cultivation and the transference effects. Furthermore, the findings from the interviews indicated social presence as an important concept in the game-environment. Consequently, social presence was included in the survey.

Social presence is one dimension of the multidimensional concept of presence which “can be understood as a psychological state in which the person's subjective experience is created by some form of media technology with little awareness of the manner in which technology shapes this perception "(Tamborini, 2006, p. 226). The three dimensions that are

most often found in the literature to define presence are self presence, spatial presence and social presence. Self presence, or "being", is the presentation of oneself in the virtual world. Spatial presence, or "being in", is mainly determined by two qualities: involvement and immersion. Involvement relies on mental vigilance and depends on the meaningfulness of an environment while immersion depends on the environments ability to isolate people from other surrounding stimuli (Tamborini, 2006). Within an ARG environment the concepts of self and spatial presence as psychological structures become problematic because part of the game is in the, spatially present, physical reality.

Social presence, or "being with", is the sense of being in a social environment. The social interactions were repeatedly mentioned in all interviews. Both a MMORPG and an ARG have the potential to induce a strong sense of social presence as most of the other players are actual humans. Based on the interviews, social presence emerged as an important concept and was expected to be higher for ARG players than MMORPG players. It is plausible that social presence will account for, or at least mediate, the perceived reality and the learning effects (both cultivation and transference) of the gaming environment. This reasoning leads to the fourth hypothesis:

Hypothesis 4: ARG players experience a higher social presence within the game environment than MMORPG players do.

The survey targeted two very specific groups; ARG or MMORPG players, and questioned them on three core topics along with some general demographic questions. The survey carries an explorative element in comparing the demographics of the ARG group and the MMORPG group. The three core topics of the survey are perceived reality, strategic knowledge and social presence. Based on the theoretic framework perceived reality is

expected to be higher for the ARG-players. The cultivation effects were determined by comparing in-game experience of strategic knowledge with the expectancy of the behaviour of people in general on the same strategic knowledge. The transference effects were determined by comparing in-game experience of strategic knowledge with the application of the same strategic knowledge in everyday life. As perceived reality is expected to be higher for the ARG-players, it follows that cultivation, transference and social presence will also be stronger in the ARG group than in the MMORPG group.

Method.

Participants.

The sample was collected through online snowballing. The link to the online survey was spread through e-mail, on several MMORPG forums, in game (World Of Warcraft), in ARG chat channels, at the ARG Unfiction forum and Tweeted by the webmaster of www.argn.com. Most of the participants were gathered by efforts of people that are important members of the communities from which the sample was collected. The collection period ran from the 1st till the 16th of March 2010, during this period a request for participation was repeatedly prompted at several online locations. At the end of the data collection period, a dataset with 205 participants was obtained. Of these 205 participants, 31 participants did not make the selection criteria of being either an ARG or MMORPG player and were rejected by routing of the survey after 2 questions. Of the remaining 174 participants 93 did not fill out the entire survey (14 ARG and 79 MMORPG) and their data was subsequently removed before analysis. The remaining number of participants is 81 (N = 81) of which 36 were ARG players and 45 were MMORPG players.

The ARG group consisted of 22 males and 14 females, with a mean age of 26.53 years and a modus of 19 years. Of the 36 ARG players that filled out the English questionnaire 27 were native English speakers, there were 12 different nationalities present in the sample with American being the most common (*N*=18, 22.2%). The MMORPG group consisted of 40 males and 5 females, with a mean age of 22.24 years and a modus of 19 years. Of the 45 MMORPG players that filled out the English questionnaire 28 were native English speakers, there were 14 different nationalities present in the sample with American being the most common (*N*=14, 17.3%). The education level and current employment status of both groups can be seen in the frequency table (table 2) below.

Table 2

Education and employment ARG(N = 36) and MMORPG(N = 45) participants

	ARG	MMORPG
Highest education level		
Elementary school	1	0
High school	10	18
College	9	14
Higher professional education and/or Bachelor degree	7	7
University degree and/or Masters degree	9	5
PhD	0	1
Employment		
Unemployed	8	11
Part time employed	5	2
Full time employed	9	12
Student without other employment	7	15
Student with other employment	7	5

Significant differences between the two groups were found in age, $t(79)=2.061$, $p<.05$, and the gender ($M_{ARG}= 1.39$ $M_{MMORPG}=1.11$) $t(79)=3.062$, $p<.05$. Meaning the ARG group was older

and contained more females, compared to the MMORPG group. All the other demographic variables showed no significant differences.

Procedure.

The survey started with two selection questions; “Have you ever played an ARG?” and “Have you ever played a MMORPG?”. If the participant gave a negative answer on both occasions they were routed out of the survey with an 'exit-screen'. Depending on if the participant answered positive for ARG of MMORPG, the survey routed to the pertaining question set. The sets for both ARG and MMORPG were identical in wording and sequence, except for prompting the ARG or the MMORPG gaming environment in all the screen introduction texts. After the selection questions, participants were asked demographic questions, strategic knowledge applied to others, strategic knowledge applied to self, two screens of questions on social presence, strategic knowledge applied to in-game behaviour, questions on perceived reality, the first encounter of the strategic knowledge statements and a few questions about time spent gaming and gaming preferences. At the end of the survey an open comment field was displayed. Filling out the entire survey took around 15 minutes.

Measurements.

The dependent variables were operationalized by different sets of scales. The perceived reality scale was based on a scale by Potter (1986) which contained 20 items regarding TV-shows. However, a number of these items were not suitable to translate to an ARG/MMORPG environment. After deleting these, there were ten items left that were adapted for usage regarding the perceived reality of gaming environments. Examples of the statements used are “The things that happen to you in the gaming environment are probably the same as the things that happen to you in real life” and “In the gaming environment I feel I

can learn about life's problems and situations". These statements could be evaluated by indicating an answer on a 5-point Likert scale. A reliability test showed a Cronbach's Alpha of .85 (*M*=33.83, *SD*=8.31) .

The measurement for social presence while playing was based on the "Measure of co-presence, social presence, subjective symmetry, and intersubjective symmetry" by Biocca and Harms (2002). The questions for co-presence were left out as the concept of spatial presence would have been confusing in the (partly) physical environment of the ARG players. The remaining questions were reworded to fit the ARG and MMORPG environment and interactions. Examples of the final statements are "I am able to understand what the other gamers mean" and "The action of other gamers are often dependent on my actions". These and similar statements could be evaluating by plotting the answers on a 5-point Likert scale. A reliability test showed a Cronbach's Alpha of .75 (*M*=82.58, *SD*=10.06).

In the survey it was found that perceived reality overall determined 45% of the variance in the experience of social presence within the game environment for the ARG-players and 38% of the variance for the MMORPG-players. Meaning that perceived reality is more important to the experience of social presence in an ARG compared to a MMORPG environment.

Strategic knowledge was measured by eleven statements (shown in table 3 below) based on the examples of strategic knowledge that were gotten in the second wave of online qualitative interviews. Answers from these interviews were moulded into example statements of strategic knowledge and participants were asked to respond to these statements on four occurrences in the survey. For the first three occurrences the answers were plotted on a 5-point Likert scale, the fourth occurrence had a binary yes/no answer option. The first

occurrence applied the statements to “Below you find a list of strategies that other people may adhere to in their everyday life (in- and outside of a gaming environment). Please indicate how much, according to your personal opinion, other people adhere to the following strategies in their everyday life”. The second occurrence ran the same statements within a different context; “This question screen refers to your behaviour. Below you will find several statements on how you could behave (in- and outside of a gaming environment). Please indicate how much you agree that you usually behave like this:” The third occurrence “this question screen refers to behaviour while gaming. Please indicate how much you agree that you have experienced this within an [ARG or MMORPG] environment. I have experienced the following strategies within the [ARG or MMORPG] environment.” In the fourth occurrence of the strategic knowledge statements. Participants were asked to “Please indicate if you agree that you first encountered these strategies in an [ARG or MMORPG]. I experienced the following strategies for the first time within the gaming environment”. The sequence in which the eleven statements appeared on screen was randomized, to minimize test-effect. The Cronbach's Alpha did not indicate a reliable scale measurement, further factor (Principal Component Analysis) analysis showed a different number of factors for the four occurrences of the measurement, indicating that this measurement cannot be included in further analysis as a scale but should be included as separate statements in any statistical analysis. Although all statements are strategic knowledge, they refer to several very different concepts. It is therefore logical that the statements cannot be aggregated into a one-dimensional model. Table 3 below displays the eleven statements and their scores on ‘in the gaming environment’.

Table 3

Overview of strategic knowledge statements in within-game occurrence (N = 81).

Statement	Mean	Std. Dev.
You gain the most by working together with others	4.42	.96
If you put in the effort, you will rise up in life	4.15	1.04
You should adjust your behaviour to the circumstances you are in	4.14	1.06
Think on your feet	4.11	1.05
You need to be careful how much you disclose about yourself	4.10	1.08
You should act first and the rewards will come later	3.90	1.10
Its good to be competitive because you achieve more than others	3.57	1.32
If you just ask for it, you will receive the help you need	3.53	1.17
You should not strive for the maximum but for the optimum	3.46	1.38
You should use your appearance, and the effect this has on others, in an effective way	3.12	1.39
Do not adapt to your environment but make the environment adapt to you	2.51	1.34

Note. Table is ordered by the mean scores, not by number of statement

Results.

To test the hypothesis mentioned in the theoretical framework and in the discussion of the interviews, the data collected in the survey was put through several statistical analysis. The hypothesis and their test-results are described below.

The first hypothesis argued that:

Perceived realism of the game is higher among ARG players compared to MMORPG players.

This hypothesis was tested by performing an independent sample t-test between the ARG and MMORPG group on the mean index of the scores on perceived reality. The ARG mean was indeed found to be greater (M = 3.08, SD = 0.76) than the MMORPG mean (M = 2.66, SD = 0.74) and significantly different t(74,616) = 2.49, p <.05. The first hypothesis was confirmed.

The second hypothesis argued that:

Cultivation effects of game content is higher among ARG players compared to MMORPG players.

The analysis incorporated the effect of 'in game experience' on 'people in general' while distinguishing between ARG and MMORPG players. Moderated regressions were calculated to test this hypothesis, of which the results are shown in Table 4. For each of the 11 strategic knowledge statements a separate moderated regression was calculated. The dependent variable of the moderated regressions was one of the 11 strategic knowledge items reflecting how much users believed other people would apply certain strategic knowledge in their everyday life. Frequency of occurrence of the same strategic knowledge within the game (z-standardized) and whether users played ARG or MMORPG games (0/1 coded) were entered as determinants in a first step of the regression. To test for potential moderation effects, an interaction term of both variables was entered in a second step of the regression (Aiken & West, 1991).

Table 4. Cultivation effect. Results of a hierarchical regression analysis (Step 2) of the in game experience of a strategic knowledge statement on the belief that other people apply this strategic knowledge statement in real life (N = 81).

	Statem. 1		Statem. *2*		Statem. 3		Statem. *4*		Statem. 5		Statem. 6		Statem. 7		Statem. 8		Statem. 9		Statem. 10		Statem. 11	
Variable	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β
Within-Game Occurrence	.18	.26	.15	.12	.15	.18	.19	-.03	.18	-.06	.13	**.29**†	.15	**.36***	.16	.06	.17	.19	.14	.11	.12	**.34***
Game type: ARG vs. MMORPG	.22	-.14	.23	.01	.21	-.07	.27	.09	.26	-.13	.17	.12	.22	**.19**†	.23	.09	.25	-.10	.22	-.03	.20	**-.20**†
Occurrence x Game type Interaction	.22	-.14	.24	-.01	.21	-.09	.27	-.17	.26	-.07	.17	-.15	.22	-.01	.24	.06	.25	-.10	.23	.06	.20	-.19

*Note: Statement1 (R^2 Step 1 = 0.05, ΔR^2 Step 2 = 0.01). Statement 2 (R^2 Step 1 = 0.01, ΔR^2 Step 2 = 0.00). Statement 3 (R^2 Step 1 = 0.02, ΔR^2 Step 2 = 0.00). Statement 4 (R^2 Step 1 = 0.02, ΔR^2 Step 2 = 0.01). Statement 5 (R^2 Step 1 = 0.02, ΔR^2 Step 2 = 0.00). Statement 6 (R^2 Step 1 = 0.03, ΔR^2 Step 2 = 0.01). Statement 7 (R^2 Step 1 = 0.15**, ΔR^2 Step 2 = 0.00). Statement 8 (R^2 Step 1 = 0.02, ΔR^2 Step 2 = 0.00). Statement 9 (R^2 Step 1 = 0.02, ΔR^2 Step 2 = 0.00). Statement 10 (R^2 Step 1 = 0.02, ΔR^2 Step 2 = 0.00). Statement 11 (R^2 Step 1 = 0.09*, ΔR^2 Step 2 = 0.02). $^{\dagger}p$ < .1. *p < .05. **p < .01 (two-tailed)*

As can be seen in Table 4 only some of the statements have a significant within-subject correlation. Statement six 'It's good to be competitive because you achieve more than others' (β .29, p <.1) showed a trend towards the correlation between being experienced within the game environment and expected behaviour of other people. Statement seven 'You should use your appearance, and the effect this has on others, in an effective way.' (β .36, p <.05) showed a significant correlation between being experienced within the game environment and the expected behaviour of other people. Statement seven also showed a trend towards a correlation (β .19, p <.1) between the game-type (ARG or MMORPG) and the expectation of that behaviour in other people. However, proof for the interaction effect could not be found. Statement eleven 'You gain the most by working together with others'. (β .34, p <.05) showed a significant correlation between being experienced within the game environment and the expected behaviour of other people. Statement eleven also showed a trend towards a correlation (β -.20, p <.1) between the game-type (ARG or MMORPG) and the expectation of that behaviour in other people. However, proof for the interaction effect could not be found. A relationship between the experiencing certain strategic knowledge in-game and the expectancy that other people apply this in everyday life can be shown. But no differences between the ARG and MMORPG group could be found. Therefore, the second hypothesis was rejected.

The third hypothesis argued that:

Transfer of strategic knowledge experienced within the game environment into the real world is stronger among ARG players compared to MMORPG players.

The analysis incorporated the effect of ‘in game experience’ on ‘you apply this’ while distinguishing between ARG and MMORPG players. Moderated regressions were calculated

to test this hypothesis, of which the results are shown in Table 5. For each of the 11 strategic knowledge statements a separate moderated regression was calculated. The dependent variable of the moderated regressions was one of the 11 strategic knowledge items reflecting how much users would apply certain strategic knowledge in their everyday life. Frequency of occurrence of the same strategic knowledge within the game (z-standardized) and whether users played ARG or MMORPG games (0/1 coded) were entered as determinants in a first step of the regression. To test for potential moderation effects, an interaction term of both variables was entered in a second step of the regression (Aiken & West, 1991).

Table 5. Transference effect. Results of a hierarchical regression analysis (Step 2) of the in game experience of a strategic knowledge statement on the application of this strategic knowledge statement in real life (N = 81).

	Statem. 1		Statem. *2*		Statem. 3		Statem. *4*		Statem. 5		Statem. 6		Statem. 7		Statem. 8		Statem. 9		Statem. 10		Statem. 11	
Variable	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β	SE B	β
Within-Game Occurrence	.18	.20	.13	**.27** †	.15	**.42****	.19	**.37***	.15	**.47****	.19	**.33***	.14	**.67****	.16	**.31***	.12	.07	.17	**.28***	.15	**.39****
Gametype: ARG vs. MMORPG	.22	-.06	.21	-.13	.20	.08	.27	-.06	.21	-.02	.25	-.03	.21	-.04	.24	-.08	.18	-.07	.27	-.09	.24	-.11
Occurrence x Gametype Interaction	.22	.21	.21	-.10	.02	.15	.27	.09	.21	.04	.25	.11	.21	-.09	.24	.17	.18	.19	.29	-.00	.24	.05

Note: Statement1 (R^2 Step 1 = **.14***, ΔR^2 Step 2 = .02). Statement2 (R^2 Step 1 = 0.06, ΔR^2 Step 2 = 0.42). Statement3 (R^2 Step 1 = **0.28****, ΔR^2 Step 2 = 0.01). Statement4 (R^2 Step 1 = **0.19****, ΔR^2 Step 2 = 0.00). Statement5 (R^2 Step 1 = **0.26****, ΔR^2 Step 2 = 0.00). Statement6 (R^2 Step 1 = **0.17****, ΔR^2 Step 2 = 0.01). Statement7 (R^2 Step 1 = **0.38****, ΔR^2 Step 2 = 0.00). Statement8 (R^2 Step 1 = **0.18****, ΔR^2 Step 2 = 0.02). Statement9 (R^2 Step 1 = 0.04, ΔR^2 Step 2 = 0.02). Statement10 (R^2 Step 1 = **0.08****, ΔR^2 Step 2 = 0.00). Statement11 (R^2 Step 1 = **0.18**,** ΔR^2 Step 2 = 0.00).

†p < .1. *p < .05. **p < .01 (two-tailed)

Most of the statements show a significant within-subject correlation, however none of the grouping or the interaction variables produced significant results. Statement three 'Think on your feet' (β .42, p <.01) showed a significant correlation between the experience of this strategic knowledge statement within the game environment and the application of this statement in everyday life. Statements four 'Do not adapt to your environment but make the environment adapt to you' (β .37, p <.05), statement five 'You need to be careful how much you disclose about yourself' (β .47, p <.01), statement six 'It's good to be competitive because you achieve more than others' (β .33, p <.05) , statement seven 'You should use your appearance, and the effect this has on others, in an effective way.'(β .67, p <.01), statement eight 'You should act first and the rewards will come later' (β .31, p <.05), statement ten 'If you ask for it, you will receive the help you need' (β .28, p <.05) and statement eleven 'You gain the most by working together with others'. (β .39, p <.01) all showed effect correlations of within game experience on application in everyday life.

Although there is clearly a relationship between the experiencing of strategic knowledge in-game and the application of that same knowledge in everyday life, no difference between the ARG and MMORPG group could be found. There is no support for the hypothesis, therefor the third hypothesis was rejected.

The fourth hypothesis argued that:

ARG players experience a higher social presence within the game environment than MMORPG players do.

This hypothesis was tested by performing an independent sample t-test between the ARG and MMORPG group on the mean index of the scores on social presence. As expected, the ARG mean was found to be greater (M = 3.18, SD = 0.39) than the MMORPG mean (M = 3.00, SD

= 0.57) and approaching a significant difference $t(77.330) = 1.65$, $p = .052$. Although hypothesis 4 was not confirmed, the data does show a statistical trend towards support of the hypothesis. .

Discussion survey.

Searching for the cultivation effects of strategic knowledge within the game environment on the expectancy of the behaviour of others not a lot was found. Three statements produced a cultivation effect regardless of ARG or MMORPG environment. The expected strong cultivation effects moderated by game type were not found.

This thesis has shown, for the first time, that ARG-players experience a higher perceived reality while in-game compared to MMORPG-players. This is in line with the expectancies and is probably due to the fact that physical reality is already incorporated in the game. This incorporation brings along all the typicality of physical reality. Furthermore, the player itself is involved as a platform, bringing along all the player's experiences and expectancies into the game environment.

Searching for the transference effect of several strategic knowledge statements that might be experienced within the game environment on the application of such statements in everyday life several effects of experience on application were found. However, no correlation of game-type on the application of a certain statements was found, and no interaction effects of game-type * within game experience was found.

ARG-players display a higher amount of social presence compared to MMORPG-players. One possible explanation lies in the collaborative nature of ARG game play; people play more “with” the other players. The lack of an avatar to 'hide behind' could also work towards a greater feeling of social presence.

General Discussion

This thesis investigated different effects that playing an ARG might have during and after game play. It focussed on two concepts that occur during game play; perceived realism and social presence, and on two effects that occur after game play; cultivation effects and transference effects. In order to check for cultivation and transference effects, appropriate strategic knowledge statements were determined in the interviews and subsequently used in the survey. The MMORPG players were incorporated in both studies as a means of comparison. It was expected that ARG players would score higher on all the investigated concepts than MMORPG players. These expectancies were mainly based on the inclusion of physical reality in the ARG game environment and the focus on cooperation in the game play.

This thesis has shown that perceived reality is higher for ARG-players compared to MMORG-players. Within the ARG environment it is more likely that shared mental models are involved to create and support its own reality. This could be largely due to the fact that players are not just users but also creators of the game content, allowing for the co-creation of reality as a shared view of group processes, norms and roles that helps coordination and performance (Roberson, 2006 as cited in Van Swol, 2008). This co-creation of the in-game reality may contribute to heightened sense of perceived reality. The narrative of an ARG is interactive (McGonigal, 2004) meaning that the game content will, to a high degree, be what players expect it to be because they hold influence over it. A reality judgement will be made based on these expectations (Shapiro et. al., 2006). As studies have shown that the perceived reality positively correlates with the strength of the psychological effects of game play (Anderson & Dill, 2000) it is expected that any effects that can be achieved by game play (e.g. learning) will have a stronger effect in an ARG environment. Although perceived reality

has been shown to be higher in ARG than in MMORPG. This thesis offers no empirically supported explanation as to why this is so. Future research should apply the six dimensions of Hall (typicality, plausibility, factuality, emotional involvement, narrative consistency and perceptual persuasiveness. Hall, 2003) to the ARG environment and investigate by which one of these dimensions the perceived reality is heightened.

Social presence showed a statistical trend towards being higher in an ARG environment compared to a MMORPG environment. This may well be due to the collaborative nature (McGonigal, 2004) of an ARG and the incorporation of physical reality in the game environment. Social presence is part of a subjective experience created by some form of media technology (Tamborini, 2006) which an ARG creates not only by some form, but by almost all forms of media simultaneously and by incorporating physical reality. In short, it packs a bigger punch. Again the shared mental model (Roberson, 2006 as cited in Van Swol, 2008) seems a likely construct within the ARG environment that would heighten a sense of social presence. Such shared mental models improve task performance (Cannon-Bowers et. al. as cited in Van Swol, 2008) which is needed to fulfil the challenges that a group of ARG-players face.

In the search for cultivation effects of the in-game experiences an interaction effect between the game-type (ARG or MMORPG) and the in-game experiences on the expected behaviour of others could not be found. But the statement referring to competitiveness showed a cultivation effect, and the statements referring to collaboration and the statement referring to deliberate use of appearance both showed a cultivation effect as well as a trend towards a correlation with game-type. This correlation between game-type and deliberate use of appearance goes in the direction of the ARG-players, meaning the ARG-players expect

people in general to behave in such a fashion, whilst the collaboration correlation goes in the direction of the MMORPG-players.

The transference effects that were expected to be found higher for ARG than MMORPG were not found as such. Several effects of in-game experience on application in everyday life were found but no correlations between game-type and the application of said statements. Seven of the eleven strategic knowledge statements produced a transference effect, which is considerable. The same strategic knowledge statements produced more transference effects than cultivation effects which seems counter intuitive, but might be explained by group identification. If gamers consider themselves to be an in-group, which is likely given the high amount of social presence, it follows that 'people in general' would be an out-group. Accordingly, experiences of a member of the in-group (gamer) do not translate well into expectancies of the out-group (people in general). At the same time, applying statements in everyday life that were experienced while in the in-group environment, would reinforce the identification to the in-group.

Both the cultivation and transference effects were measured through a measurement created within this thesis. Although based on research, the measurement is probably not a very robust one. Which might partly explain the lack of interaction results from this measurement. This has been a first attempt to research strategic knowledge applied within a gaming environment, and further research into what the common or most powerful strategic knowledge encountered and/or learned in a gaming environment might be is very desirable. To come up with a robust scale on strategic knowledge in a gaming environments would take numerous in-depth interviews, followed up by surveys on a larger scale.

Future research should preferably be of a longitudinal design; following the perception of reality and transference between realities of non-gamers, beginning MMORPG players, advanced MMORPG players, beginning ARG players and first generation ARG players.

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Appendix

Interview questions

Associative key-words

Could you please tell me the first things that come to your mind at the following words:

- Sunshine
- Play
- Pizza
- Virtual
- Time
- Real
- Game

Player experience

Please explain to me what an ARG/MMORPG is?

What is it about ARG/MMORPG that you enjoy?

I would like to do a little exercise with you; this might seems strange but please allow yourself to go with it. Please close your eyes and imagine yourself when you were playing; Can you tell me what you feel/experience while playing, and what else, and what more? Do you feel like part of the game; can you describe that for me, do you feel you are there; can you describe that feeling?

Introduction:

I understand that for most people playing a game does not radically change their reality or their personality; I am not looking for the radical but for the nuances. Everything we do has an impact on our lives somehow; I am trying to find the impact of the game you play and your perception on this.

Reality change

- What influence do you think playing ARG/MMORPG has had on your life?
- How has it done this? Through what mechanisms?
- Does it change back and forth when you start or stop playing?
- Do you think the effects of playing are negative/positive?

Escapism or functional

- Are there things/traits/customs/realisations that you first encountered/used in MMORPG/ARG >anything that you noticed or experienced for the first time?
- Have you applied this outside of the game?
- What has that changed for you?
- Have you made new friends through playing ARG's/MMORPG's?
- Do you have non-game contact with them?
- How often/How long do you have contact?
- How do you have contact?

Clues (ARG only)

- How do you determine what is part of the game?

- Where do you look for clues?
- When do you look for clues?
- Have you ever found game clues when you weren't looking for them?

End question: Am I part of the game?

To determine the type of player >light, medium, heavy< effects on perception of reality and transference are expected to behave accordingly, that is stronger effects for heavy players.

Player intensity

1. What MMORPG/ARG do you play currently?
2. Do you remember when you started playing MMORPG's/ARG's?
3. Have you played MMORPG/ARG before? How many?
4. Do you sometimes play multiple MMORPG's/ARG's at the same time?
5. How much time do you usually spend on MMORPG's/ARG's per week?
6. How much time do you spend on average on MMORPG's/ARG's per day?
7. Do you purposely allocate time to playing (e.g. tonight from 8 till 10) or do you more drift into it (or externally driven)? How do you structure/arrange your playing time if at all?
8. Have you ever play longer than you intended? How much longer, has this happened often?

Survey questions ARG

This survey wants to find out more about player's experiences of games. As the questions are about your experience there are no right or wrong answers, only how you feel about it and what you think about it. All the questions are in a multiple choice format for processing purposes. Some question formats use the same statements but refer to a different situation or concept. Therefore, please always carefully read the text at the top of a question page. At the end of the survey there is an open question where you can leave any comments you might have. The survey takes about 10-15 minutes to fill out. Thank you so much for wanting to share your experiences! Please click on the button at the bottom right to continue to the next page. Please indicate your answer by clicking the corresponding option. When you click the lower right button , your answers are stored and you navigate to the next screen.

Have you ever played an Alternate Reality Game? (e.g. I love Bees, Last Call Poker)

- Yes
- No

First some general questions:

What is your age? …..

You are

- Male
- Female

Your nationality is …….

Are you a native English speaker?

- Yes
- No

Your highest level of education is

- Elementary school
- High school
- College
- Higher professional education and/or Bachelor degree
- University and/or Master degree
- Phd

You are currently:

- Unemployed
- Parttime employed
- Full time employed
- Student without other employment
- Student with other employment

General strategies

Below you find a list of strategies that other people may adhere to in their everyday life (in- and outside of a gaming environment). Please indicate how much, according to your personal opinion, other people adhere to the following strategies in their everyday life:

	People do not adhere to this strategy at all	People always adhere to this strategy
If you put in the effort, you will rise up in life		
You should not strive for the maximum but for the optimum		
Think on your feet		
Do not adapt to your environment but make the environment adapt to you		
You need to be careful how much you disclose about yourself		
Its good to be competitive because you achieve more than others		
You should use your appearance, and the effect this has on others, in an effective way		
You should act first and the rewards will come later		
You should adjust your behaviour to the circumstances you are in		
If you just ask for it, you will receive the help you need		
You gain the most by working together with others		

You

The former question screen referred to your opinion on the behaviour of people in general, this question screen refers to your behaviour. Below you will find several statements on how you could behave (in- and outside of a gaming environment). Please indicate how much you agree that you usually behave like this:

	Fully disagree	Fully agree
If you put in the effort, you will rise up in life		
You should not strive for the maximum but for the optimum		
Think on your feet		
Do not adapt to your environment but make the environment adapt to you		
You need to be careful how much you disclose about yourself		
Its good to be competitive because you achieve more than others		
You should use your appearance, and the effect this has on others, in an effective way		
You should act first and the rewards will come later		
You should adjust your behaviour to the circumstances you are in		
If you just ask for it, you will receive the help you need		
You gain the most by working together with others		

In ARG

The following statements are about your experiences with other people while playing an Alternate Reality Game. There are no right or wrong answers, we are just interested in your experiences. Please indicate how much you agree with each statement:

	Fully disagree	Fully agree
When I am happy, the other gamers tend to be happy		
I am easily distracted from the other gamers when other things are going on.		
The other gamers tend to ignore me		
When the other gamers are feeling sad, I tend to be sad		
The other gamers are easily distracted from me when other things are going on.		
I am sometimes influenced by the other gamers mood		
When the other gamersare happy, I tend to be happy		
The other gamers pay close attention to me		
When I am feeling nervous, the other gamers also seem to be nervous		
When I am feeling sad the other gamers also seem to be down		
The other gamers are sometimes influenced by my mood		
I pay close attention to the other gamers		
When the other gamers are nervous, I tend to be nervous		
I tend to ignore the other gamers		

In ARG

The following statements are about your experiences with other people while playing an Alternate Reality Game. There are no right or wrong answers, we are just interested in your experiences. Please indicate how much you agree with each statement:

	Fully disagree	Fully agree
My actions are often dependent on the actions of other gamers		
What the other gamers do often affects what I do		
I am able to understand what the other gamers mean		
The behaviour of the other gamers was often in direct response to my behaviour		
My thoughts are clear to the other gamers		
The other gamers thoughts are clear to me		
The action of other gamers are often dependent on my actions		
The other gamers are able to communicate their intentions to me		
What I do often affects what the other gamers do		
My behaviour is often in direct response to the behaviour of other gamers		
The other gamers are able to understand what I mean		
I am able to communicate my intentions clearly to the other gamers		

In game learning

Below you will find several statements on possible behavioural strategies. The former question screens with these statements referred to behaviour in general, this question screen refers to behaviour while gaming. Please indicate how much you agree that you have experienced this within an Alternate Reality Gaming environment. I have experienced the following strategies within the ARG environment

	Fully disagree	Fully agree
You should use your appearance, and the effect this has on others, in an effective way		
If you put in the effort, you will rise up in life		
You need to be careful how much you disclose about yourself		
If you just ask for it, you will receive the help you need		
Think on your feet		
Do not adapt to your environment but make the environment adapt to you		
You should act first and the rewards will come later		
You should not strive for the maximum but for the optimum		
You gain the most by working together with others		
You should adjust your behaviour to the circumstances you are in		
Its good to be competitive because you achieve more than others		

The following statements concern your opinions and experiences with the Alternate Reality Game environment. Please indicate how much you do or do not agree with each statement:

	Fully disagree	Fully agree
In the gaming environment I feel I can learn about life's problems and situations		
The people that I interact with in the gaming environment are probably just like that in real life		
I feel I can learn a lot about people in the gaming environment		
There are a few characters in the gaming environment that I would like to be more like		
People act in their own lives in the same as they act in the gaming environment		
The things that happen to you in the gaming environment are probably the same as the things that happen to you in real life		
The interactions I see in the gaming environment help give me ideas about how to solve my own problems		
The people who are very funny in the gaming environment are probably very funny in their real lives		
I see characters in the gaming environment whom are like people I know in real life		
There are certain characters in the gaming environment which I admire		

I get useful ideas about how I should act around my friends and family

by watching what people do in the gaming environment

First Encounter

Below you will find several behavioural strategies. Please indicate if you agree that you first encountered these strategies in an Alternate Reality Game environment. I experienced the following strategies for the first time within the gaming environment

	Yes	No
You should use your appearance, and the effect this has on others, in an effective way		
If you put in the effort, you will rise up in life		
You need to be careful how much you disclose about yourself		
If you just ask for it, you will receive the help you need		
Think on your feet		
Do not adapt to your environment but make the environment adapt to you		
You should act first and the rewards will come later		
You should not strive for the maximum but for the optimum		
You gain the most by working together with others		
You should adjust your behaviour to the circumstances you are in		
Its good to be competitive because you achieve more than others		

Player

The following questions concern your gaming preferences:

The first time I played an Alternate Reality Game was

- Less than 12 months ago
- 1 to 3 years ago
- More than 3 years ago

I play(ed) multiple Alternate Reality Game's at the same time

- Yes
- No

On average, I play Alternate Reality Games .... days per week

When I play an Alternate Reality Game, I usually play for .... hours

Besides Alternate Reality Games, I also (sometimes) play

- PC strategy games
- PC/Console first person shooter
- PC/Console sports games
- Tabletop/Pen and paper role play
- Board games
- Live Action Role Play
- Arcade games
- Browser games
- Online gambling
- Massively Multiplayer Online
- Massively Multiplayer Online Role Playing Game

- Collectable/Trading card games
- No other games

Open end

You have reached the end of the survey. Here is an open space for anything you might have to say after going through all the questions. Perhaps you feel that there is something I asked poorly or not at all... Please indicate any comments you might have below, they will be very helpful to me. Thank you so much

Strategic knowledge within game environment

Table 1

The eleven strategic knowledge statements within game environment

Statement	N	Mean ARG	Std. Dev. ARG	N	Mean MMORPG	Std. Dev. MMORPG	T test	Sign. (1 – tailed)
If you put in the effort, you will rise up in life	36	3,94	1,22	45	4,31	,85	-1.53	.65
You should not strive for the maximum but for the optimum	36	3,67	1,26	45	3,29	1,46	1.25	.11
Think on your feet	36	4,03	1,16	45	4,18	,96	-.62	.26
Do not adapt to your environment but make the environment adapt to you	**36**	**2,83**	**1,39**	**45**	**2,24**	**1,26**	**1.98**	**.02**
You need to be careful how much you disclose about yourself	**36**	**3,78**	**1,10**	**45**	**4,36**	**1,00**	**-2.44**	**.01**
Its good to be competitive because you achieve more than others	**36**	**3,17**	**1,44**	**45**	**3,89**	**1,13**	**-2.52**	**.01**
You should use your appearance, and the effect this has on others, in an effective way	36	3,00	1,39	45	3,22	1,40	-.71	.24
You should act first and the rewards will come later	36	3,97	1,11	45	3,84	1,11	.52	.30
You should adjust your behaviour to the circumstances you are in	36	4,14	1,07	45	4,13	1,06	.02	.46
If you just ask for it, you will receive the help you need	**36**	**3,78**	**1,04**	**45**	**3,33**	**1,24**	**1.75**	**.04**

You gain the most by working together with others	36	4,47	,88	45	4,38	1,03	.45	.33

The set of eleven statements applied to 'in the gaming environment' showed a MANOVA of $F(11) = 1.82$, $p < .05$ proving a statistical significance of the hypothesized within a specific context. Several of the statements produced a significant result in t-testing, as are shown in table 2 below.

Table 2

Experience of strategic knowledge statements within the game environment.

Statement	M_{ARG}	SD_{ARG}	M_{MMORPG}	SD_{MMORPG}	***t***	**Sign.**	***β***
Do not adapt to your environment but make the environment adapt to you	283	139	224	126	1.98	.02	-0.22
You need to be careful how much you disclose about yourself	378	110	436	100	-2.44	.01	0.27
Its good to be competitive because you achieve more than others	317	144	389	113	-2.52	.01	0.27
If you just ask for it, you will receive the help you need	378	104	333	124	1.75	.04	-0.19