

Monsters on your lawn: Immersion and Presence in Location-based Games

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Chapter One: Introduction and the history of location-based games

Introduction:

In July 2016, the launch of Niantic's location-based game *Pokémon Go* was a big cultural moment, described in *Forbes* as “[taking] over you social media feeds and you friendly neighborhood park” (Eordogh, 2016). It's unprecedented popularity led to it servers crashing under the amount of traffic the game demanded (Quito, 2016), a huge rise in the share value of Nintendo (Wells, 2016) but most crucially, unlike any other successful game, gained enormous media attention due to its intersections with the real world. As a location-based game, national stories involved unfortunate incidents that illustrated the disconnect between the digital game itself and the real world in which it was being played such as the discovery of dead bodies (Cockburn, 2016) or Holocaust museums filled with Pokémon (BBC, 2016). These are both not typically issues encountered within the standard Pokémon game, but players were focused on the game and so therefore unaware of their surroundings.

The explosion in popularity of *Pokémon Go* brought a lot of mainstream news attention to other location-based games. One article in the *Herald Review*, offered up suggestions for “12 immersive location-based games to play besides Pokémon Go” (2016), unaware of the complexity of the discussion of immersion in relation to location-based games this headline suggested. The concepts of immersion and presence have been key in discussions of games, particularly virtual reality games which aim to further immerse the player within a virtual environment. Presence is of particular interest for psychologists who want to understand the similarity of behaviour in real and simulated environments (Slater and Wilbur, 1997).

This headline though, brings forth the question over how immersive a location-based game can be, as it is taking place within the physical world, a concept that instinctively seems to lack an obvious immersive factor. Whether or not this is something worth pursuing in location-based games is a concept is, based off of this headline, at the very least something that is worth discussing and considering.

This aim of this research paper is to examine location-based games in regards to immersion and presence and ask to how someone can experience presence within a game that takes place within the real world. This paper will look at the relationship between the digital and physical world taking place in these games and determining how this effects the concepts of immersion and presence. In order to this, this paper will first consider these games' physical, non-digital predecessors to gain an insight into their appeal, before going onto examine the concepts of immersion and presence and their relationship with one another. Afterwards, how these concepts have previously been handled in regards to location-based games will be looked at, before applying some of these ideas to some case studies. This analysis will range from mobile-based games such as *Pokémon Go* to more restricted location-based games such as *Agent P's World Showcase Adventure* and the way that each of the different approaches these games take to immersing players affect these issues. Finally the results of this analysis will be evaluated.

History of Location-Based Games:

However, *Pokémon Go* and other location-based games did not appear in a vacuum, and have been something which had been built towards being possible for over a century. First it is

important to understand how this point was reached set the stage for where location-based games came from and how they were developed to get to this point in July 2016.

One of the earliest versions of a location-based game was an activity called 'Letterboxing', a form of location-based gameplay involved placing hidden boxes in public spaces and distributing clues in order to discover these. It dates back to 1854 in Dartmoor, with the intention of each person who found a certain pile of rocks to leave a message for the next person to find this location (Letterboxing on Dartmoor, 2015). In order to find these boxes, the descriptions would have to provide a level of challenge, with developers beginning to add puzzles, riddles or even storylines, often linked to the local area where the boxes were located. These games relied on a knowledge and exploration of the area in which they were located, encouraging players to walk and lose themselves in generally rural areas.

It was this foundation that geocaching was then based upon, a similar activity bringing a digital element by revolving around the use of GPS receivers. Geocaching involves using a GPS receiver, a digital device, to locate hidden containers, or 'caches,' in various locations in the real world. Global Positioning System was developed by the United States Government providing geolocation to receivers around the world, being launched in February 1978. To begin with, the version accessible to the general public although the full accuracy was restricted to the military with GPS for civilians having intentional, time-varying errors of up to 100 metres (Aber et al., 2003). This was repealed on 2nd May 2000, which then allowed small containers to be placed in specific locations rather than the previous 100 metres radius, until Bill Clinton signing a policy directive to turn off Selective Availability, which was disabled on 2nd May 2000 (Geocaching, 2012). Once this took place, the use of these GPS devices were precise enough for geocaching to begin. Before with this level of error made them too

imprecise to have the direct pinpointing needed for such games. Geocaching began almost immediately after the Selective Availability was disabled, with the first documented occurrence taking place on the 3rd May 2000, when one user wanting to test the accuracy of this GPS without Selective Availability, and posted the GPS location of a hidden container in Oregon being posted onto Usenet, which other users were then able to uncover (Geocaching, 2012). Here was the start of using a digital device in order to find physical objects, and unlike letterboxing, this was able to take place in urban environments as well as rural ones.

The next element that was necessary to lead to location-based games was for this GPS technology to be integrated into mobile phones. This first took place in order to help Enhanced 9-1-1 (E911) in the United States, a system that tries to automatically associate a location with the origin of the call to help emergency services be able to more accurately reach the caller's location, rather than simply relying on the description provided on the phone. With the increase in popularity of mobile phone in the 90s, this created a problem whereby these phones were unable to be located via E911 in the same way landline phones were able to. In response to this, in 1994 the Federal Communications Commission ruled that mobile phone companies in the United States must be able to provide a more accurate location to emergency services from calls from mobile phone (Federal Communications Commission, 1994). Some phone companies worked on finding a solution on the network side, complying by using information from their signal towers, but companies such as SnapTrack began looking into ways for a handset based solution, and finding ways to integrate GPS into the phones themselves. In 2000, Snaptrack was purchased by Qualcomm for \$1 Billion (LaPedus, 2000), and later phone companies such as Verizon, Sprint and Nextel in the United States were all using GPS to comply with the FCC ruling (Charles, 2006).

Although GPS was initially installed for the above purpose, developers began to explore ways in which this technology could be used. Programs began to be created for mobile phones, such as *Mologogo* which allowed users to share their location with their friends in real time, and *Smarter Agent*, a property buying program (Charles, 2006). The main limitation was that most networks did not allow the user of the phone to access their GPS location, with only limited authorised services being allowed. This meant a program such as *Mologogo*, as an app developed by independent programmers, could not be used by people on most networks, restricting availability to a few authorised, and paid for, services.

The introduction of the smartphone and the population of apps fully opened up the opportunities for these location-based games to expand beyond the relatively limited purposes before all developers could create them. *Groundspeak*, a geocaching app became available for smartphones, alongside this a host of other applications (Geocaching, 2012). As this GPS location began to be integrated into games, and a host of wider applications. The prominence of locative media has now reached the point in the present day when apps such as *Uber* and *Tinder* are a prominent part of people's day lives, with the 'gamification' of everything from work to sex being routinely examined and criticised (Hakala, 2013; Braude, 2017). It is within this context, where we are surrounded by various locative technology with game elements, which contemporary location-based games have developed and popularised.

Chapter Two: Understanding Immersion and Presence

To analyse the role of immersion and presence within location-based games, it is important to understand what these concepts are and the distinction between these two terms which are frequently conflated. This section will analyse the different schools of thought regarding the significance of immersion in game design, the role it plays and how it is distinct from presence. It will then go on to look at more detailed theories of presence, before finally looking at how these concepts can be applied to location-based games and the role of immersion within this.

Defining Immersion and Presence:

To understand Immersion and Presence in regards to location-based games, it is best to first look at how they are defined in relation to virtual reality, as these terms are most prominently discussed in relation to Virtual Reality. Virtual Reality is “a three-dimensional, computer generated environment which can be explored and interacted with by a person” (VRS, 2015). As such, immersion is an crucial element to consider in the creation and analysis of such an all-encompassing environment which a player can become part of. There are many conflicting and disparate disciplines that are interested in concepts of immersion and presence from philosophy to psychology, resulting in this confusion over the use of this terminology. Often the concepts of immersion and presence are conflated and so here some of definitions of what the two mean will be explored and the relationship between the two concepts examined.

Slater and Wilbur (1997) approached the issue from a computer science background, defining immersion in terms of the technology used to convey a virtual environment. How immersive

something is depends on how far this technology is able to create the illusion of reality to the senses. Slater and Wilbur think this illusion need to be capable of four attributes: *Inclusive*, referring to how far the technology is able to shuts out the physical world; *Extensive*, how many stimulus modalities are included such as temperature, light, sound, smell, taste; *Surrounding*, how panoramic this virtual reality is (rather than just being a narrow field of view); and finally *Vivid*, how high quality each sensory modality is, for example vivid sound would have a high bit depth or sample rate. Beyond these attributes, Slater and Wilbur also think that immersive technology will be *Matching*, with the player's motor functions having an equivalent display within the technology. Finally, the last factor required is a *Plot* which is self-contained and is able to present an alternative unfolding of events distinct from those happening within the real world.

In contrast to immersion, Slater and Wilbur think presence is not measurable or quantifiable in the way that immersion is, instead being a psychological sense of being in the environment. If someone is highly present, they should experience the virtual reality more than the physical reality, considering the virtual environments on display as "as places visited rather than as images seen" (p. 4). From their research, they offer up hypotheses for presence and its relationship to immersion. Firstly, presence is both a subjective and objective state, subjective being how much they feel like they are in the environment, with the subjective element being how far they go to act like they are in it. The second being that presence increases as immersion works in all its ways- so that immersion influences the presence, and thirdly that the greater the plot manages to removed a person from reality into a self-contained world, the greater the chance of presence. They also take important note to distinguish presence from realism. The feeling of presence is not believing something is the real world, but rather feeling it more than the real world. The aim is not to trick the player into believing it is the real world, but creating a

virtual environment that is able to immerse the user, with presence being the central goal of virtual reality.

Slater and Wilbur's theory focuses strongly on this *Inclusive* factor of immersion, the sense of blocking out of the real world and complete enveloping a person within a virtual world. This is something that is not only difficult to do within location-based games but actively undesirable, with a large part of the appeal of these games being the movement through the physical world. Instead, within location-based games the immersion may come from the extent of how well the physical world and digital world are able to work together, rather than how well the digital can block out the physical. The idea of the importance of *Plot* is also a key part of this paper, by creating an alternative explanation for what is taking place, the user can be more easily immersed within *what* is taking place rather than focusing on *how* it is taking place. Whilst, presence being a psychological state makes sense within this paper, it also seems limited in its understanding of presence and if presence truly is the central goal of such an environment, then a stronger theory of how this can be analysed is necessary.

Witmer and Singer (1998) aimed to develop a framework for being able to analyse presence in technology. They approached this from the perspective of the social sciences, wanting to be able to create a questionnaire in order to be able to assess presence. Their view of immersion is confusingly similar to that of Slater and Wilbur's definition of presence. They defined immersion as a "psychological state" of experience in which someone is "enveloped by, included in, and interacting with" (p. 225) a virtual environment which is providing continual stimuli. Factors that increase immersion include how isolated the user is from the physical environment, perception of being represented within this virtual environment, perception of movement in this environment and these interactions appearing natural. Rather than with Slater

and Wilbur's definition of immersion as the technology's abilities to create this illusion, here these technological factors increase the level of immersion, but the term immersion only refers to the psychological state created by these technologies.

Witmer and Singer then go on to define presence in contrast to this as being the experience of feeling like you are in another state or place, whilst physically being in another place. They describe this as being a "subjective" state (p. 225), which is not a binary (i.e. a person is present or not present) but instead something that can be degrees of. The degree of presence refers to the extent this attention shifts from the physical environment to being in this virtual environment. With a greater degree of immersion comes greater degree of presence.

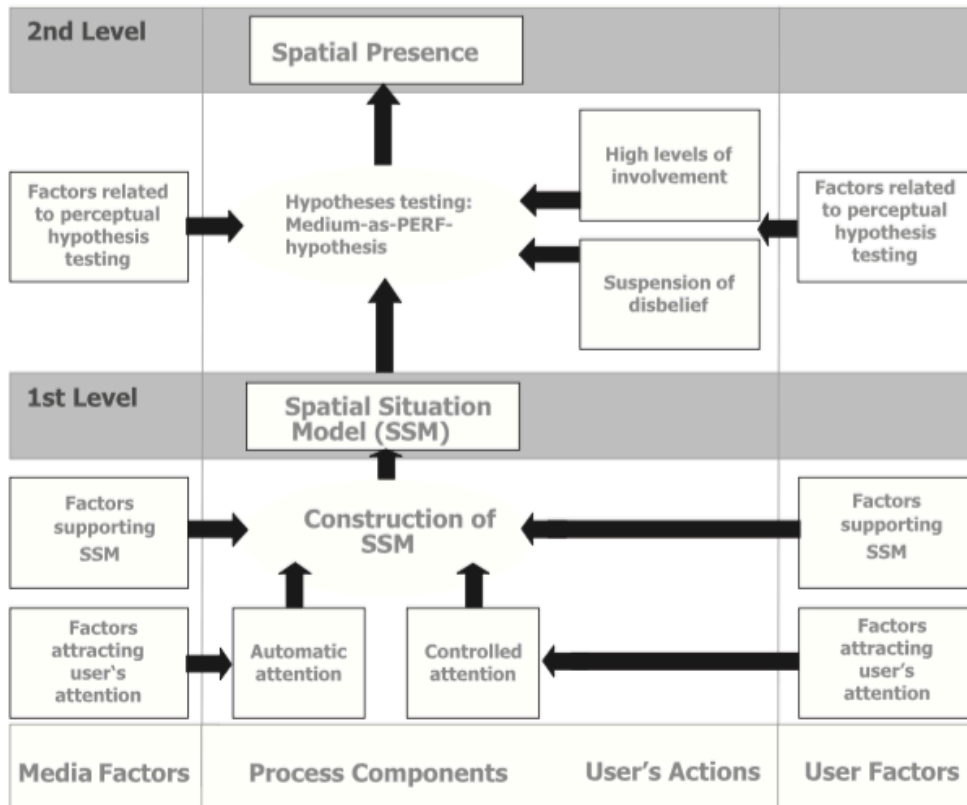
Interestingly, they did not see immersion as the sole factor in creating presence suggesting *Involvement*, which is the psychological state of how invested someone is in interacting with this activity (p. 227), also have an influence on the level of presence. How involved someone is depends on the meaning or significance they attach to the stimuli they are being presented with in the virtual environment, if the events taking place hold their attention, then they are to become more involved. Witmer and Singer saw both immersion and involvement as necessary elements in order to experience presence. Their questionnaire was therefore based around asking participants questions relating to this immersion and involvement that they experienced in order to analyse how present they were within the virtual environment.

In this paper the distinction drawn here between immersion and presence is very minor, with the difference being enveloped by an environment versus feeling to be in a different place being two very similar psychological states. The paper's most important development in relation to location-based games is that of involvement being important to presence. Despite immersion

being similar to presence, this paper's focus on involvement shows that if the player does not wish to engage with the environment, the level of immersion will always be lower.

In contrast to Witmer and Singer's attempts to develop a framework for presence and then a questionnaire, Wirth et al. (2007) collaborated on a cross-disciplinary attempt to develop a framework for understanding how presence works. In this paper they refer to a specific strand of presence called *Spatial Presence*, which is a similar concept to that of Witmer and Singer's presence. They define spatial presence as a sense of being there, when a person's perception fails to acknowledge the role that that technology has played in creating the sense they are in a different location to that of their physical location (p. 495). They note that this concept of spatial presence is not only applicable to virtual reality but can be a general phenomenon related to a lot of different concepts, which could extend to location-based games. Notably, they did not see any value in making the distinction between immersion and presence, seeing presence as simply the experimental counterpart to immersion.

This framework is represented through the following diagram:



Wirth et al.'s Presence chart (2007)

This diagram above shows how the players form a mental model of the game world within their mind, referred to as a Spatial Simulation Model. Once the player has created this representation in the mind, they decide whether this model is one that they think they are in this world or not. They then begin to favour this representation over the physical world as a point of reference for where they are. This may not be a conscious decision, and could easily be entered and exited. Unlike Witmer and Singer, they do not think there can be degrees of presence, viewing presence as a binary element that can either be happening or not, even if the switch between these happens quickly. This view of presence as a binary seems to make more sense, especially within the framework provided by Wirth et al. When presence is defined as a sense of being there, this does seem to be something that is an absolute feeling, even if it is quickly felt and not felt in quick succession.

Immersion and Presence in Location-based Games:

These issues by the theorists previously discussed have primarily been discussed in relation to virtual reality or sometimes in more general terms, but bringing these concepts to location-based games brings more complications to the issues. In most games, immersion appears to be desirable or attractive element but as Mäyrä and Lankoski (2009) points out if a player immerses too much into a game, they will no longer be present in the physical world, which goes against much of the aims of such a game. This is not only from an idealistic point of view, but also because of the dangers present in the real world which cannot be controlled by the game designer (p. 141). One suggestion is that these games should aim to create a “heightened awareness” (p. 140) of their own surroundings and an effective location-based game will not achieve device-centric immersion similar to that presented above, but should find ways to engage with the surroundings.

This essential divide that takes place between the physical world and the digital world can prevent immersion within this digital world and is the focus of Gradinar et al.’s research (2015), focuses on the issues surrounding a concept they refer to as the ‘dichotomy of immersion’, tackling this from a design strategy perspective. In this paper, Gradinar et al. make no attempt to distinguish between immersion and presence, with their use of the word immersion being closer to definitions of presence provided by Witmer and Singer. When talking about location-based games, the paper draws a distinction between physical immersion and digital immersion. This *Inclusive*, absolute digital immersion that the other literature is referring to, particularly those concerning virtual reality, is impossible in location-based games as it will always be interrupted by this physical movement through space that takes place in location-based games (p. 2). Physical immersion, on the other hand, is when people are immersed in the physical world, the

exact thing that most attempts at immersion or presence are trying to supersede (p. 1). In a location-based game, this ‘dichotomy of immersion’ (p. 7) which is the way a player playing a location-based game’s attention will repeatedly flick between the physical and digital worlds. They argue that due to this dichotomy of immersion, most location-based games focus too much on immersion within the digital world, which undermines the importance of the physical space within these games which is the central draw of location-based games. Gradinar et al. argue to counter this there are two main elements location-based games can include in their design in order to overcome these. Firstly de-emphasising digital screen elements and emphasising physical interaction, and the other is to use physical objects in the real world to link back to the digital world (p. 2). Both of these aim to draw more attention to an immersion within the physical world, drawing on the appeal of the roots of these games within letterboxing and geocaching. The aim is to make the area represented on the digital device be a map referencing physical elements in the game arena, rather than being the game arena itself (p. 2).

This paper captures well the problem at the heart of immersion in location-based games. Whilst its second solution might not be one that is practical to implement with the scale of many location-based games (a fact they acknowledge themselves within the paper (p. 2)), the changing of the way to avoid too much focus on the digital device is a key element in analysing the effective of location-based games. This distinction between physical and digital immersion is a crucially important one to make in regards to location-based games and analysing the ways location-based games draw attention from the digital to the physical will be an important part of the next chapter. Whilst this paper does not address the immersion and presence distinction with any serious analysis, the importance of this distinction comes up crucially in discussion of the role of the digital map in regards to physical immersion. When designing games in order to fit this criteria, the device should act as a map to physical elements in the real world. These

elements are therefore united by a sense of presence, creating a mental image that unites the physical world and the digital map which is displayed on the screen.

Augmented reality is becoming more commonly used in these games as a way of merging the digital world with the physical world. In contrast to the *Inclusive* view of immersion from Slater and Wilbur, Georgiou and Kyza (2017) talk about the role that location-aware Augmented Reality can play in creating immersive environments that take place within the real world. In these games the device is not trying to obscure what is taking place within the physical world, in the way that a virtual reality device is aiming to. Augmented reality, rather than aiming to achieve the virtual immersion which virtual environments aim to achieve, is aiming to create context immersion (p.28). Instead of this attention attempting to be switched from the physical world to the digital world, Augmented Reality tries to blend physical and Digital elements together to present one unified whole (p. 27). This seems an effective way to consider immersion in regards to augmented reality, seeing it as way of immersing an element within the context presented, rather than being a completely immersive environment separate from all other elements.

Going forward into the next section, immersion will be considered in terms of the technology used to create this environment, whilst presence will be the psychological effect of this technology. Although this is based on Slater and Wilbur's formulation, the specific elements of their theory such as the concept of immersion as Inclusivity are too closely linked to virtual reality and would not be useful in a discussion of location-based games. Presence is the psychological state of mind, which believes it in a location, considering it in terms of how the cross-disciplinary effort from Wirth et al, and how this image is created within the mind.

Not only is immersion going to be considered in how it creates this sense of presence, but also the factor of involvement, brought up by Witmer and Singer. Gradinar et al.'s ideas are especially important to the issues of location-based games and as such will be examined more closely in the next chapter. As these ideas are specifically geared towards location-based games, they are at best discussed in light of such games.

Chapter Three: Analysis of location-based games in regards to immersion and presence

This chapter will analyse games in light of the concepts explored in the previous chapter, including some of the most popular mobile location-based games such as *Zombies, Run!*, *Pokémon Go*, and *Pokémon Go*'s predecessor *Ingress*. Particular focus will be given to their notable features, such as the use of sound in *Zombies, Run!*, which takes a different approach primarily relying on sound to immerse, as well as the use of augmented reality in *Pokémon Go*. Alongside these games, in light of Gradinar et al.'s discussion of the use of physical elements, this chapter will take a look at a location-based game in a more controlled environment. *Agent P's World Showcase Adventure* an interactive smartphone game located at Walt Disney World in Orlando, Florida will be discussed in how it uses physical elements to create a greater sense of physical immersion.

Ingress and *Pokémon Go*:

Ingress is a 2012 location-based mobile game, created by Niantic that in many ways was a predecessor to *Pokémon Go* (Truong, 2016), which when released in 2016, using much of the same mechanics and structure as its predecessor.

Ingress' story is embedded within the real world, involving the Large Hadron Collider released new exotic matter was released into the world which is able to control human thought. This exotic matter enters the world through portals, and different teams have to battle for control of this matter across the planet. *Pokémon Go* on the other hand, takes the concepts from the popular handheld game series and transfers it to mobile, as you play as an avatar across a map,

travelling around the area catching Pokémon in the area and visiting Pokéstops and Pokémon gyms along the way.

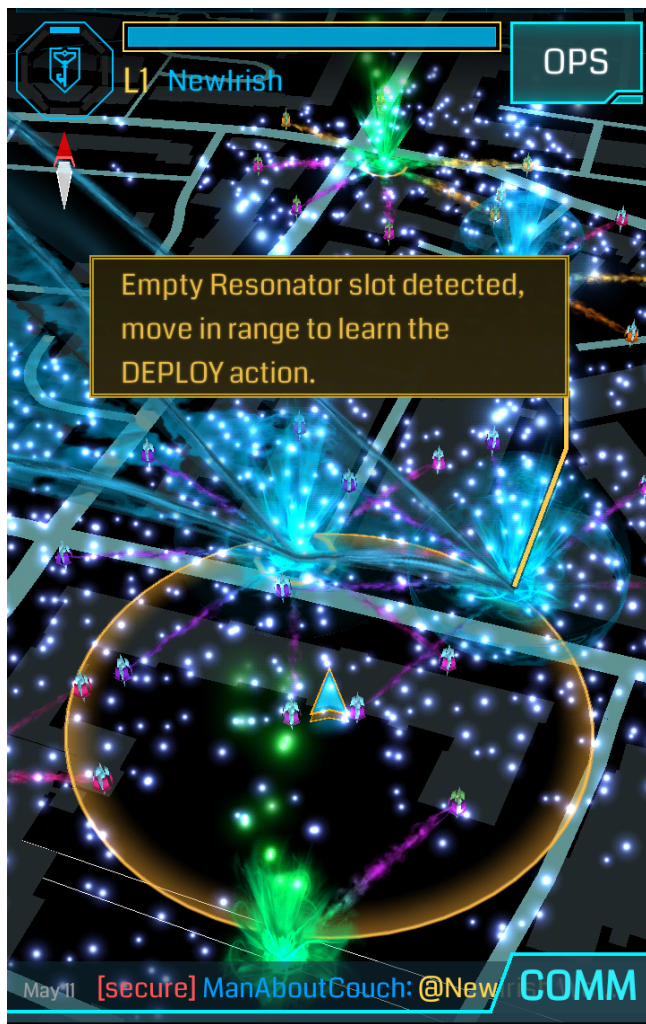
Despite the games being similar in many ways, this difference in story makes a key difference to each game's sense of presence. In *Pokémon Go*, there is not disconnect between this plot taking place within the game and that which is really happening within the real world. This plot does not create any sense of presence for providing an alternative explanation for the location-based gameplay. In *Ingress*, on the other hand, the mobile phone is a 'scanner' and written into the story are the various invisible portals that can only be detected through this screen.

One key element of this plot is the exotic matter coming through various landmarks around the world. This story involves a hidden underground world and as such the fact that this scanner is able to detect elements that are not visible to the human eye is woven into the conspiracy-laden story. Represented on the map, each place has attached to it a picture of the location and a description of the place's significance. By using this image that creates a recognition when the player is outside it in the real world a strong connection is created between the digital image and the physical object within the world. This creates a heightened awareness of where these landmarks and their significance, reinforces the link between the digital and the physical.

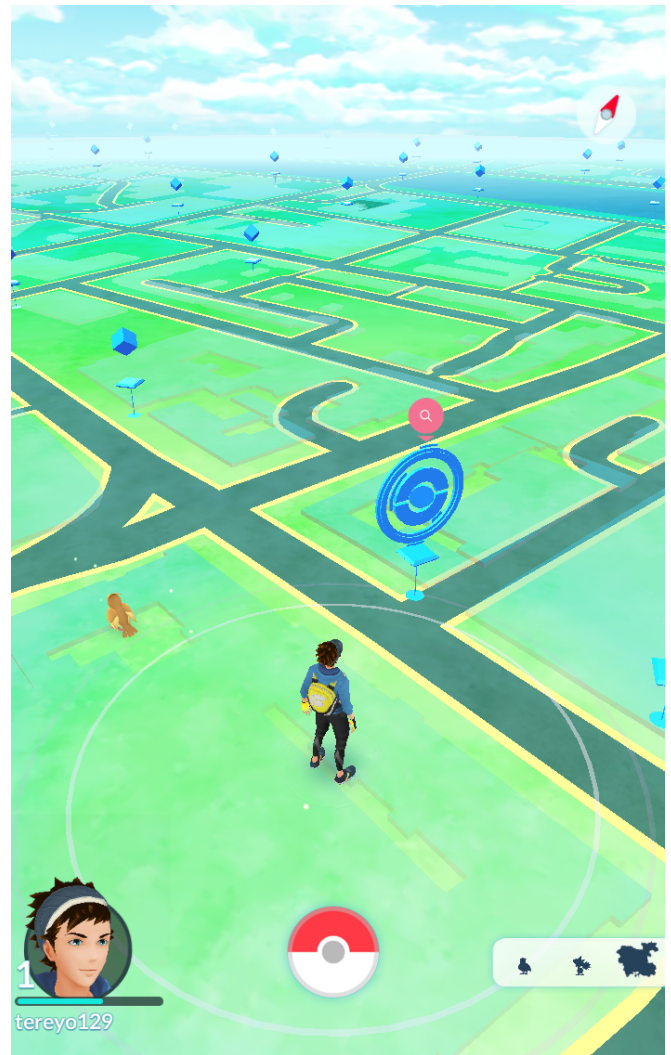
This element was transferred over to *Pokémon Go*, but here there is a disconnect between the story taking place within the device and the reality that is taking place within a physical world. Whilst a nearby landmark may be labelled as a Pokémon Gym, there is nothing embedded in the narrative to suggest why this is, only being labelled as such on the device. The local church or pub may be a Pokéstop, but in the physical world around it remains unaffected by these designations, except perhaps the many people also crowding around this stop.

Because these location-based games are based around local landmarks, both games have a social element, even if this is slightly unintended with *Pokémon Go*. In both games, players are divided into various teams or factions that have to work together in order to take over landmarks within the local area. In *Ingress*, a message board is available for each of the team's in the area to discuss strategy. Although these are real people, although the communication is primarily digital throughout the game, though various events organised by Niantic, allowing opportunities to meet other people within your faction (Ingress, 2017). *Pokémon Go*, most likely due to child safety concerns, ditched much of the communication elements embedded within the gameplay, yet due to its sheer popularity created interactions in the real world during its most popular peak as players gather around Pokémon gyms and Pokéstops (Alexander, 2016). This is one of the clearest way this game manages to create a sense of physical immersion, due to the game genuinely surrounding people. When location-based games become a dominate part of the location they are in, this naturally increases a sense of presence.

In *Ingress* the phone is able to act as a map in order to find where the portals for this exotic matter is located and find it within the real world. An arrow indicates where you are on the screen, reminiscent of maps within games or navigation devices, implying that this shows your location but is not the game space itself. The layout (see figure below) is given a technical, science-fiction interface, reinforcing this notion that the player's phone, or scanner is just a tool within the wider game-world.



Ingress' interface (2012)



Pokémon Go's interface (2016)

In *Pokémon Go*, the map is presented very differently (see figure above). At the centre of the screen is the player's personalised animé-inspired avatar, which represent themselves within the game. This directly contrasts with *Ingress*' which implies a person's location in much the same way a map can point out your location. Here this avatar instead seems to be the character you are playing as, making a walking or running motion in the direction the player moves within the world, with the instructions in the game telling the player "move in the real world to move your avatar". This makes it seem player's movement through the physical world seem to be a mechanic to move the avatar, rather than immersing the player within a story taking place within the real world. By extension, the map itself appears to be the world in which the gameplay is taking place, rather than within the real world, with the game world being a stylised version of the area around you. This is also reinforced by the way Pokémon appear out of bushes on the maps itself, moving as if they are the creature itself over a brightly coloured green space, reminiscent of the depiction of the world within the original Pokémon handheld games.

One key element to consider against this idea that the map is the gameworld, is the use of augmented reality to present the Pokémon within the game. Once a Pokémon is clicked on, the player moves into an augmented reality screen, presenting the Pokémon augmented into the real world. The juxtaposition between these fantasy creatures and locations recognisable to the player as the area around them, creates a strong link between these the digital world of the game and the physical world surrounding them. The augmented reality goes some way to try and instilling an element of presence within the ,creating an image of the real world with these images looking through the same way take a photograph on a smartphone, a viewfinder into the world in order to be able to see these creatures. This use of augmented reality is important in its use of trying to create a sense of presence, believing that these creatures do surround the player within the real world It blurs the lines digital immersion, drawing attention to the screen rather

than to the physical world, by overlaying creatures over the real world, it created a sense of presence, rooting these creatures into the location in which the player is present. This creates a context immersion Georgiou and Kyza (2017), placing these creatures within the context that surrounds them and bringing in the image of the location.

It is interesting to note that this feature was optional, partly due to many devices being unable to handle the technology, although many people chose to turn off this feature (Gamet, 2016), despite it being the most significantly immersive element of the game. Perhaps this is due to their being a sense of presence being lost due to the design choices analysed above, that this sense of immersion is less important to players. Primarily throughout this game, this immersion is digital, engrossing players their screens but limiting their engagement through gameplay with the physical world. As Gradinar et al. suggested (2015), there is an overemphasis here on the importance of the digital over the physical. The game does not make enough attempts to draw attention to physical immersion, meaning this sense of presence is weaker than in similar games such as *Ingress*.

Despite these criticisms the game was still a huge success, and to write this off as solely due to its basis in an immediately recognisable intellectual property would be a mistake. One key element this game is able to get right is building off the common, escapist fantasy narrative that the *Pokémon* games before were built off and taking it into the real world and to really leaving home and exploring the world outside hunting for Pokémon. This familiarity with the story may have created a sense of presence due to building off this investment, and creating a high degree of involvement. Though there are many limitations to this game in terms of immersion, this involvement seems to help the game overcome these issues and become the phenomenon that it has become.

Zombies, Run!

Zombies, Run! is a 2012 location-based mobile game released by Six to Start and Naomi Alderman. It is a game aimed to also work as a form exercise, referred to as an ‘exergame’ (Fulton, 2016). The story is set in a post-apocalyptic town called ‘Abel Township’, in which the player plays as ‘Runner 5’, a character responsible for running into zombie territory to retrieve supplies for this town. The player chooses missions to play, in which the player runs listening to various audio transmissions, interspersed with their own music, sometimes being chased by zombies which means the player has to run faster to escape.

Because of this exercise-based element it is unique amongst mobile location-based games for its lack of focus on the screen of the digital device, instead primarily relying on sound as a means of immersing the player. In most games it is clear what is digital and what is physical, but *Zombies, Run!* actively blurs these lines, creating a level of ambiguity over whether the source of these sounds are from the audio or from the real world. Players are still able to hear what is happening in the real world as well, and by listening on headphones. By interspersing these audio pieces with the player’s own music catalogue, these lines between the game and the real world become murkier, merging the fictional in with the real. One account describes becoming hyperaware of the sound of her own heartbeat whilst listening to the audio during this game, fitting the aesthetic of the game as she listened to this sound mixed in with that of zombies approaching nearer and nearer (Southerton, 2013). In addition, elements within the audio which are actively used to confuse the player over what is taking place within the audio and what is taking place.

This works in a similar way to the way augmented reality does, by becoming a contextual immersion rather than that of virtual immersion (Georgiou and Kyza, 2017). By bringing the players own music, these pieces of audio created for the game are embedded within the player's own soundscape, bringing in a familiar context to heighten the sense of presence through this unified context of the game. Not only is it similar to augmented reality as discussed above, it includes elements reminiscent of "augmented reality audio" which is the inclusion of naturalistic sounds amongst the artificial soundscape (Kyriakakis, 1998). *Zombies, Run!*, set in an post-apocalyptic world creates a soundscape to match this, incorporating sounds beyond just the radio transmission and the fantastical effects. This creates an encompassing in a way that most location-based game elements are unable to do, unclear over what is real and what is part of this soundscape.

It is interesting that this game therefore manages to sidestep Gradinar et al.'s dichotomy of immersion by minimising, at least visually, the digital elements and separating the senses. For the player, the visuals they are running through are the only ones that they see, with the audio creating this sense of presence by itself. Interestingly, Gradinar et al.'s respond to this focus on immersive sound as a solution to the p, arguing that it works to "[undermine] the importance of the physical space that LBGs are played in" (p. 2). Gradinar et al. advocate for a focus on physical elements, which a sole focus on audio is unable to provide no matter how effectively it is executed.

Ultimately despite the immersion there are limitations to this sounds as the player will be unable to see the zombies that are chasing them, despite zombies being traditionally visible creatures. Still the intensity of this forward propelling momentum alongside the fear of being chased by them, heightened by the increasing sound effects, is going to create a high sense of involvement

due to the way this story is built around this physical activity. Despite there being no visual component to go alongside the audio element, this helps the visuals in a sense to become part of the adventure.

It is an effective way to create this story, especially when this game due to the nature of its 'exergame' format can only work with sound as a way to achieve this. It is the sensory channel where the augmentation of artificial and real can be most effectively blur the lines and immerse this person within a digital environment in location-based games, but it is still limits to what this is able to achieve.

Agent P's World Showcase Adventure:

Agent P's World Showcase Adventure is a location-based game available to play on smartphones, accessible via a website that can be played within the World Showcase area in the Epcot Theme Park in Walt Disney World. It was introduced as the *Kim Possible World Showcase Adventure* in 2009, before having its story modified to incorporate characters from the TV show *Phineas and Ferb* in 2012 (Weiss, 2016). Originally it could only be played on modified Verizon mobile phones, but in 2016 a website was developed through which the game could be played on the player's own smartphone device, disregarding the need for custom devices (Fickley-Baker, 2016). Unlike most location-based games, this takes place within an physical environment the designers also have control over and thus includes multiple physical elements that take place outside of the device itself and provide a link to the digital world.

The purpose of the device itself then is primarily to guide the plot, which involves working an unpaid internship assisting Agent P in stopping the evil Dr. Doofenshmirtz. The player travels around the theme park areas themed to different countries in order to complete missions and save the world, being guided by the team behind OWCA via the smartphone device. This device shows cutscenes which tell the backstory of what is taking place and provide exposition for the player. The physical world, is where the majority of the player's interactions within the game come about, the device primarily being used to indicate that the player is at the correct location and sometimes triggering effects in the physical world.

Unlike other location-based games, it shares more in common with letterboxing than a typical location-based mobile game due to this physical element. The device is used primarily, aside from maintaining the plot, to guide the player round to the different physical interactive elements via a series of images, clues and hints, in a similar way to how letterboxing clues guide players to the hidden location. Whilst the typical location-based mobile game has the player's location being reported by the GPS within the phone, this game merely tells the player the location they are to head to, then confirm they are once they are in the location. In many location-based games this would be ineffective due to there being no need to moved location in order to progress the gameplay. Here, as a portion of the game is physically located in a different place it is necessary for the player to find these locations in order to achieve the full experience, especially as the answers to puzzles necessary to be progress, and other information to be transferred from the screen to the physical elements and vice versa are needed to progress.

In this game the digital device does not function as a map (being within a theme park, a map is available separately in order to navigate the park). It still fulfils some navigation functions by directing the player to the next location they need to go in order to complete their mission.

Ultimately the device is one element within this game, with the primary focus being on physical immersion over digital immersion. Whilst it takes place within an environment that has elements engineered specifically to engage with this game, the environment it takes place in still primarily designed for other functions such as shopping and exploring, making this still a game which has many unpredictable elements that could break this sense of presence in the same way as other location-based games.

In a way that distinguishes itself from many in that it integrates physical elements in a way suggested by Gradinar et al. This gives the game a strong anchor within the physical world and makes any digital immersion instead seem as part of the larger game itself as the smartphone is only one element of this, even if it a necessary one in order to play the game, avoiding this dichotomy by integrating physical elements that directly interact with the digital. One disadvantage of this physicality is that, this immersion can be broken by seeing others playing the game. Whilst the system is designed to attempt to disperse crowds to different locations (Brigante, 2012), during popular times a player will have to queue behind another player, which can destroy this level of immersion in a way that does not happen in the same way when playing a device-focused location-based game.

Still, embedding physical elements into the physical world as part of location-based games is the most effective way of ensuring physical immersion alongside the digital immersion. By creating a highly immersive environment that is able to create a strong sense of presence due to seamless integration of game elements in both the digital and physical worlds, uniting the physical and digital immersion together. Fundamentally though, this is an ideal rather than a practical reality for most location-based games. Few games get the level of opportunity that a completely artificial environment provides, but it still makes an interesting case study for

examining how these ideals can work in practise in order to understand these concepts of immersion and presence.

Chapter Four: Evaluation and Conclusion

Evaluation:

The previous chapter sought to analyse the way these games aim to immerse the player and create a sense of presence, doing this through various techniques such as augmented reality, a focus on sound and integration of physical elements. Due to these games taking place within the real world, there are always going to be limits to how effectively they are able to achieve these aims. Based off the case studies within the previous chapter, this chapter will summarise the main findings of these case studies and the most effective ways to create a sense of presence in location-based games.

A focus on physical immersion alongside digital immersion is a key part of creating a sense of presence in location-based games. The most effective way of doing this is by drawing on the origins of location-based games such as letterboxing and geocaching and embedding physical elements into the environment the player is in. This works well due to it drawing the user's attention to their surroundings, rather than simply keeping them focused on the screen in front of them. This makes the digital screen a tool which references physical objects within the real world, rather than the screen being the world of the game, firmly entrenching the game into the physical world and grounding interactions within this world. However, for most designers, this is an expensive proposition, especially unrealistic if the game takes place all over the world rather than in one-specific location.

Instead designers should turn to immersion techniques which aim to draw the focus to the physical, by creating links between the digital representation on the screen and the physical world which surrounds the player. The stronger links between the real world and the game the more effective this is and could range this could be documenting real world locations in the way *Ingress* does so thoroughly to *Pokémon Go*'s use of augmented reality. These various different immersion techniques blend together the digital and the physical and help to heighten the sense of presence for the player.

To blend these together through technology is often not an attainable design choice to completely create this sense of immersion. Alongside this, an effective story can help create a sense of presence for the player. Most of the games analysed in the previous chapter are narrative-driven games, having elaborate stories in order to draw the player in and justify their existence. The exception is *Pokémon Go*, which as part of a decades-long franchise as a built-in recognisable narrative that many people have wished to play. If people are invested in this plot, they are more likely to forgive the shortcomings of the immersive technology.

But stories involving location-based games are going to have some limitations of their format regarding story elements, especially those which try and embed themselves within the real world as much as possible. Due to the technology, there are always going to be limits to the immersion that this story can provide. It is hard to create a completely convincing story in which the player, physically within their own world, becomes embroiled in such a narrative. There is almost always going to be an element of these stories that feels disconnected or contrived similarly because of the medium it takes place in.

But this does not matter if alongside this immersion, there is a high degree of involvement. A large part of this involvement will be down to the quality of the game being played, but most crucially there needs to be a strong, core concept that justifies the existence of this location-based game.

Pokémon Go from a storytelling perspective has the distinct disadvantage of being based off a franchise with an established set of mythology, rules and iconography that must be obeyed in order to be recognisable to those who are drawn to the series. In contrast, the game has the enormous advantage of being able to use this recognisable structure as an accessible shorthand for its gameplay, immediately being able to engage people based off the concept alone. It works due to it taking a fundamental, fantastical characteristic from the original handheld games and transplanting into real life, the idea of wondering around the local area and being able to find and catch these creatures. Within the confines of its own narrative it does not provide much justification for its story, but this focus on a strong core concept works extremely well.

Due to this there is a high degree of involvement within this game. The strength of this investment alone can keep the concept together, and it is the same element that allows running away from zombies or going on a globe-trotting spy mission to work effectively, beyond the simple technological gimmickry. This does not necessarily have to be a convincing story that explains all minor elements of the gameplay within a watertight narrative. The most crucial element is a purpose that justifies this story taking place within the real world and players wanting to engage with this purpose in the design.

Conclusion:

The aim of this research paper was to assess the role that immersion and presence play within location-based games in order to better understand these concepts. Presence is desirable and possible within these games, but looking just at immersion in regards to presence as a factor is too restrictive when considering location-based games, as designers do not have enough control to create total immersion. Unlike in a virtual environment, where immersion can describe the technology that controls all the stimuli within this environment, there will always be uncontrollable external factors within location-based games. It is therefore important to understand how these can still work at creating a sense of presence, even when there is not complete immersion.

Without physical components, this immersion will always be limited within these location-based games. Presence is still very much possible however, through a strong sense of involvement from the player. Involvement is the more crucial element for presence in location-based games, as a strong core concept can pull a player into investing their time into such a game. If the concept is strong enough to create this sense of involvement, then a location-based game has the unique ability to be able to “[take] over you social media feeds and you friendly neighborhood park” (Eordogh, 2016).

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