

BETWEEN IMMERSION AND EMERSION: ORIENTATING DIGITAL GAMES TOWARDS VIRTUAL AND PHYSICAL SPACES

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ABSTRACT

Many studies on computer games explore the concept of immersion, related with the idea of engagement and presence. However, immersion defines only one side of the relation between physical space and virtual space in games. When the virtual content of the game is orientated outside the boundaries of virtual space another relation is being generated, which this paper appoints as emersion.

This paper will focus on this unstudied emersive orientation of the game interface. Specifically, this research addresses the question of how a change at interface level transforms the orientation of the interface inside out. The thesis is that from specific changes made at this level, different experiences of space in video games could in fact be generated. The aim is to analyze how these changes that are being made at interface level impact the spatial experience.

In order to achieve this aim, firstly, a conceptual framework will be developed. Secondly, an analytical model for space involvement will be proposed. Lastly, some case-studies will be proposed and some conclusions offered. This paper will contribute to the definition of the features of emersion and to the analysis of the new possibilities for experiencing space in digital games.

KEYWORDS

Digital Games, Virtual World, hybridization, immersion, emersion, involvement.

1. INTRODUCTION

Miguel de Cervantes in his “Don Quixote de la Mancha” explores just how powerful an interface the printed book could be, a medium that was already a century old when he sat down to write his particular magnum opus. Don Quixote is a perfect example of a text in which the space of fiction overlaps with the space of the reader. In the first part of the aforementioned novel, the strategy of the interface (text inside text) is to immerse the reader in the space of fiction, whereas in the second part (text out of text) Don Quixote’s actions are dragged into the space of the reader. This issue is illustrated in chapter 62, in which Don

Quixote arrives at a printing press workshop in Barcelona and comes across Avellaneda's 'false' novel about himself.

While Cervantes in his first publication was wondering what would happen if someone actually lived the fictional life of knights and knighthood described in books in real life, in the second part he seems to be wondering what would happen if the rest of the people saw Don Quixote as a real member of society, as if fiction and reality coexisted.

I would like to suggest the idea that in Don Quixote the space of Spanish reality of XVI century could be working as an extension of the fictional world, whereas the fictional world was an extension of everyday reality in the days of Don Quixote. Nowadays, people are able to see giants instead of mills, perhaps because they look at them through an augmented reality device. May we ask ourselves: do they get involved in the space of the giants or do they stay in the scope of the mills?

Let us try to give an answer. This paper will build a conceptual framework in order to understand the main aspects of the spatial experience of video games. Afterwards the main question, the objectives and the thesis will be formulated. Finally, to obtain a more profound exploration, an analytical model will be proposed with which I will analyze a case study and suggest some changes at the interface level.

2. CONCEPTUAL FRAMEWORK

2.1 Between the Physical and the Virtual

2.1.1 Physical and Virtual Space Hybridization

Nowadays there are diverse examples of hybridization between the physical world and the space of virtual worlds, such as Simulation Based Learning (SBL), Augmented Reality (AR), or Mixed Reality (MR), among others. The boundaries between virtual space -or synthetic worlds- and physical space are blurring and the dichotomous approach between real space and virtual space has been widely questioned (Lehdonvirta 2010).

Moreover, spatial hybridization is extensively used in technologies capable of adding a layer of virtuality over the physical space, such as location based and Augmented Reality devices. While visual and structural construction in virtual worlds are influenced by the physical ones (Manovich 2001) it seems to be assumed that video games generate new scientific and educational realities by means of the gamification, and new social realities by means of the increasing implementation of serious games. In addition, Castronova (2005) describes that while some synthetic worlds are closed, others are influenced by what happens in our non-synthetic world.

From an ontological point of view, Pierre Levy (1999) creates an analytical framework and states that virtualization is a process which generates a common world for individuals and includes every mediation that allow us to communicate. The Actual, the Real, the Virtual, and the Possible are four instances in the coming to pass of any phenomenon. It may be argued that it is difficult to identify clear boundaries between the

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Actual and the Virtual externally to the subject's experience. Therefore, this paper will put emphasis on how space is experienced rather than on the blurring boundaries between physical and virtual space.

2.1.2 Orientation of the Game Experience

As an experienced gamer (and virtual world user) I may use a simple adverb of location such as "here" or "there" to locate the experience of my action. The first one associates with my physical space and the second one with the space of the virtual world. This answer goes beyond the common, but not accurate dichotomy between virtual and real, because, as stated before, both spaces are real (Lévy 1999). Again, if boundaries between physical and virtual are blurring, this is because there are limits, and therefore a separation still exists. Nevertheless, what determines my way of experiencing game space has nothing to do with either of these two spaces, but with an experiential circle of motivation, cognition and emotion (Takatalo 2011). This research suggests that this experience articulates the orientation of the game towards the physical or the virtual space:

The physical space is where the subject's body resides, and it is related to the material and actual. It is structured by physical boundaries and its perception depends on the subject's senses. Its constitution is tied to the relationship of the body with the space by means of the actions that the body does in it.

The virtual environment or space is where the projection of subject's body (avatar) moves and it is related to the immaterial and the virtual. It is made out of data and its representation and interaction depends on the interface. Its constitution is tied to the relationship of interactivity with spatial representation. Interactivity activates the space, but it is straightly dependent on the subject.

The subject places his experience in one of this two spaces, or both at the same time. This experience has many aspects: perceptive, cognitive, aesthetic, social, cultural and emotional, which are inseparable from each other. This space where the experience is place is structured by subjective symbolic systems that relate to the above mentioned aspects. This spatial idea is close to the concept of "magic circle" described by Montola and Stenros (2009) as a contractual barrier that separates the events and motivations of the game from those that belong to the realm of ordinary life.

2.1.3 Spatial Involvement

Digital games are psychotechnologies, term coined by De Kerckhove (1997) to address any technology that emulates, extends or amplifies the power of our minds, modifying our consciousness. He affirms that these technologies will turn our exterior world into an extensive consciousness, taking us from being "Homo Theoreticus" to be "Homo Participans". Similarly, the experience of digital games and virtual worlds is International Conferences Interfaces and Human Computer Interaction 2015,

Game and Entertainment Technologies 2015 and Computer Graphics, Visualization, Computer Vision and Image Processing 2015 determined by the experience of taking active part in a virtual environment. These ask players to adapt themselves to -and form a relationship with- physical and social aspects of digital games, while involvement, presence and flow characterize the experience of acting in a virtual environment. Calleja (2007) exposes a multidimensional analytical model for involvement that constitutes six frames structured on macro and micro-involvement. The macro explores motivational attractors during a long period of gaming, while the micro explores the depths of the moment by moment experience.

Calleja asseverates that the subsequent intensification of experience is represented by ‘incorporation’, as a ‘state of deep involvement that results in a shortening, or disappearance of distance between player and game environment’.

In this paper involvement is understood as the subject’s adaptation to the spatial symbolic system of a particular video game, accepting a group of interactional and representational conditions that acquire consistency and meaning of space. Spatial involvement depends on how the subject-player perceives, feels and understands differentiated spatial symbolic systems, on how he or she adapts to them and keeps them apart in his or her mind. For example, a player can be completely involved in the symbolic system of a game’s world and meanwhile carry out actions such as drinking, eating or speaking. These actions belong to the logic of physical space, and have different relationship between motivation, cognition and emotion. Space Hybridization

2.2 Towards the Physical and the Virtual: The Interface

2.2.1 Transferring Spatial Involvement: Narrative, Representation and Interaction

This paper proposes that in digital games and virtual worlds, involvement is transferred by representation, interaction and narration. Just as when walking down a crowded street the subject receives and deals with kinaesthetic information by using sidewalks, crosswalks or subways, when navigating throughout the space in a virtual world the subject uses buttons, commands, toolbars to deal with that kinaesthetic information that configures the space (perspective, sounds, maps, textures, colors...). This is because representation and interaction are two sides of the same coin that it is used to transfer the user’s involvement. On one side the transfer is given using images and gestures, and on the other side using rules and instructions. Narration is the coin itself, or, better said, how it is ordered and configured.

2.2.2 Orientating the game Interface

De Souza e Silva states that the universalization of ubiquitous technologies has enabled the existence of hybrid spaces where “users do not perceive physical and digital spaces as separate entities, and do not have the feeling of ‘entering’ the Internet, or being immersed in digital spaces” (de Souza e Silva 2006). The subjects situate themselves in space according to where their actions are involved and make sense. Let us study an example. The game “Dance Star Party” takes place in a very simple Virtual world where the player follows instructions and performs a dance which is required by the game. The dance is a reality that happens in the player’s living room but it is involved in and makes sense within the game, therefore we could say that the living room has turned to be part of the virtual world and that the involvement is orientated towards the physical world. Depending on where the interface orients the involvement of subject actions a taxonomy can be made:

- **Immersive orientation.** The mental-emotional space of the subject is engrossed by a synthetic virtual space, his awareness of physical self is immersed inside a different environmental space and all the subject’s actions are oriented towards that virtual space. This kind of orientation is implemented in most main stream

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- **Emersive orientation.** The subject's mental-emotional space is pulled to the physical space, where he or she bears awareness of the physical self. All the subject's actions are oriented towards the physical space but mediated through a virtual environment. This sort appears especially in games that use such controllers as Wiimote or Kinect, or those that use location aware device to use physical space as a playground.
- **Comprehensive orientation.** The subject's mental-emotional space is expanded by a synthetic virtual space but also takes place in the physical space. All subject's actions are oriented both towards the Virtual and the physical space. These are, for example, location based and Mixed Reality games. Immersion can alter the way the world that is perceived by the player (Weger & Loughnan 2014). Conversely, an emersive gameplay actually alters the reality, as do Alternate Reality games, that change reality in many different ways (Haring 2010).

3. QUESTIONS, THESIS AND OBJECTIVES

The main question this paper will address is whether game experience can be orientated towards the physical space as well as toward the virtual space, and how new practices of space in digital games are appearing. The question is: could a change at the interface level transform the mental-emotional experience of space in digital games and virtual worlds into something different?

This study holds the thesis that making changes at the interface level would generate new experiences of space in digital games and virtual worlds and change the orientation of the game experience. This paper will explore these changes and analyze how they impact the experience of space. The objectives of this research are:

- To analyze how the game experience is orientated towards the physical space and towards the virtual space, in relation to the concepts of spatial involvement and orientation of the interface.
- To explore how new experiences of space in games can be created by making changes at the interface.

4. ANALYTICAL MODEL FOR SPATIAL INVOLVEMENT

The mental-emotional third space that this paper introduces is determined by the experience of acting in a particular space, which is at the same time determined by the Spatial Involvement of those performed actions.

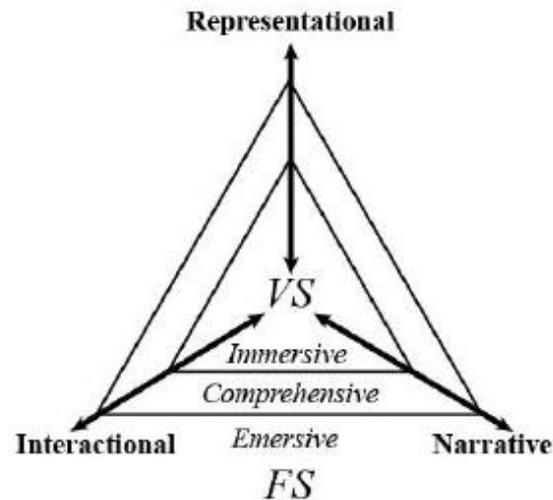


Figure 1. Analytical model of interface orientation

I propose a three-dimensional analytical model for Spatial Involvement, as shown in figure 1, in which narrative dimension, representational dimension, and interactional dimension are three different areas of variation between physical and virtual space. These areas of variation indicate subject's sense of acting in a particular symbolic system, in which Narrative correlates with the happening, interactional correlates with the performing, and representational correlates with the appearance.

The maximum grade of immersion is a total independence defined by the loss of awareness of physical space (FS). The maximum grade of emersion is a complete directness outside the virtual space (VS). This model has been partially inspired by Milgran-Takemura's (1994) Reality-Virtuality continuum.

4.1 Narrative Dimension

The concept of narrative that is held in this research suggests not only a sequence of events, but also spaces, concepts, ideas or any other abstract data. Therefore, the narrative dimension designates, along with International Conferences Interfaces and Human Computer Interaction 2015, Game and Entertainment Technologies 2015 and Computer Graphics, Visualization, Computer Vision and Image Processing 2015 rhetorical mode of discourse, the whole arrangement of an interface. This concept of narrative is closely related to Manovich's (2001) Database Cinema. Digital games and virtual worlds reproduce the narrative tradition of visual languages mediated by a camera, but instead of registering physical phenomena, the camera in digital games gives access to a set of interconnected data and algorithms that are decoded as forms of a synthetic space.

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4.1.1 Narrative Dimension Range

Narrative correlates with the happening of subject's actions, which can range from a total narrative independence of the physical world and a complete autonomy of virtual worlds, to a real-life determined narrative. E.g. U2 pop music band performing a simulated concert in Second life is determined by those that they perform in Physical Space. Here is an array of instances in the narrative dimension range, from the most immersive (virtual space orientated) to the most emersive (physical space orientated) narrative:

1. Traditional video-game. Events that occur in a virtual environment only make sense inside the fictional world, because refers only to fictional contingency. First Person Shooter games are a good example.

2. Metaverse. Although the events are virtual, the porosity of metaverses allow them to be transferred to physical life events. Events that occur in a virtual environment can become a fact in physical space, as when Anshe Chung became not only a virtual world millionaire but also a real-world one too.

3. Ubiquitous game. In these games the fact of exploring physical space gives information of virtual environment because it has been covered by virtual layers. They are usually provided with GPS devices.

4. Serious game. These have a purpose beyond mere fun that belong to real-life and physical space, such as educate, train or inform (Michael & Chen 2006). For example, America's Army has been reported to be an utterly efficient recruitment tool for the United States Army.

5. Serious ARG. Alternative Reality Games use real life events and physical space to develop transmedia networked narrations that are carried out collectively. The main philosophy is refusing the fact of being playing a game, which is called 'This is not a game' (Szulborski 2005). The serious ARG are those that have a purpose beyond mere fun. World Without Oil was a game that asked players to imagine the world as if a real oil crisis were occurring, and players had to come up with ideas to overcome the situation.

6. Gamified process. As Deterding (2011) defines it "is the use of game design elements in non-game contexts". Although transformed, gamified processes are still more related to physical than to the virtual.

7. Reality games. These are games that are immersed in real-life and can be mediated as digital games, such as true or dare. These games refer to real-life events and are exclusively related with physical space.

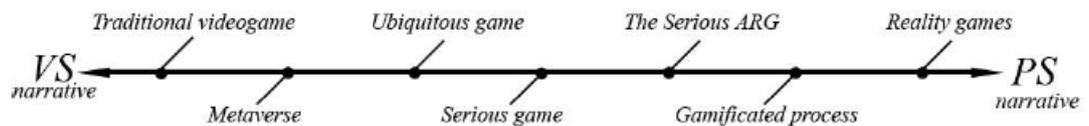


Figure 2. Cases ordered from the most immersive to the most emersive in relation to the narrative dimension.

4.2 Representational Dimension

The procedures of representation are connected with a long cultural tradition. Cartography, descriptive geometry, renaissance painting, scenic space, cinematographic space and virtual reality define the current representation of the space in digital games and virtual worlds. As Manovich says: “The visual culture of a computer age is cinematographic in its appearance, digital on the level of its material, and computational (i.e. software driven) in its logic” (Manovich, 2001: p.241).

4.2.1 Representational Dimension Range

Both physical and virtual space have a constant influence feedback from each other in its Representational Dimension. There are several possibilities of correspondence between physical and virtual space in this representational dimension that range from a totally virtual depiction to representations of physical world.

1. Virtual representation. Those are representations of virtual space and objects, without any relation with the physical space. Virtual worlds are a good example of this representational mode.

2. Augmented virtuality. It consists of including representations of real world inside the virtual space.

3. User interface. This refers to graphic interface that display the options, functions or applications of any operative system or program.

4. Virtual window (trompe l'oeil). Those are virtual frames where the space on display is generated by computer and integrates in real space like a trompe-l'oeil, as a part of architectural space, therefore expanding the physical space.

5. Virtualized reality. These are virtual representation of reality, such as virtual models of real buildings, or the process of capturing actor’s movement for a videogame production.

6. Augmented reality. It consists of amplifying the real objects by projecting images on them or by mixing the images taken by a camera with a digital layer. These images belong to the physical space, but as they have been modified digitally they are also virtual.

7. Representation from reality. Those are representations of physical space and objects.

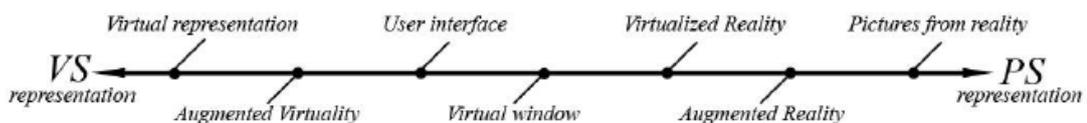


Figure 3. Cases ordered from the most immersive to the most emersive in relation to the narrative dimension.

4.3 Interactional Dimension

On an operative level, the interface is a central code for the information society, a meta-tool to deal with a world of data. In addition, the interface is how the content appears, without the possibility of separation between the interface experience and its contents. Ergodic is the term coined by Aerseth (1997) to describe the narratives that need a non-trivial effort to allow the

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reader go through it. Digital games require ergodic actions to navigate space, such as to move a joystick, a mouse or to gesticulate in front of a computer.

4.3.1 Interactional Dimension Range

Actions performed in a virtual space are in correspondence with the physical space, and vice versa. This is a range of different devices from more virtual space oriented to the more physical space oriented:

- 1. Multimodal devices** (immersive). Actions are performed directly in virtual environment and codified by head mounted stereoscopic displays with haptic systems. The player places interaction in the virtual space.
- 2. Simulator controller.** Devices designed to give a more direct interaction with the virtual environment, where player`s actions are codified by a simulated physical interface.
- 3. Human-Interaction devices.** Those designed to interact with computers, from a keypad to a gamepad.
- 4. Computer vision and gesture recognition.** These are what Jull (2010) calls mimetic interfaces. Dynamic actions performed in physical space enable interaction with virtual space, combining both.
- 5. Location aware device.** With a location aware device the whole planet can be turned into a playground, as happens with geocaching games.
- 6. Radio controller.** These are used to control object in physical space, like drones, for example.
- 7. Non-meditated interaction.** This is direct interaction with the object in physical space.

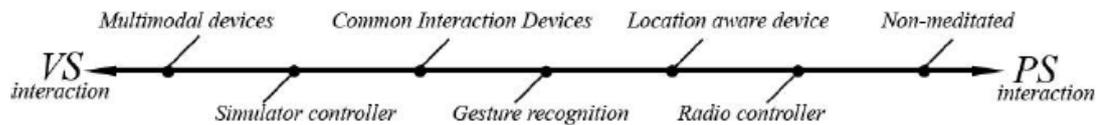


Figure 4. Cases ordered from the most immersive to the most emersive in relation to the interactional dimension.

5. CASE-STUDIES

In order to explore the questions that have been raised, this paper will apply the analytical model proposed to three case-studies so as to explore these dimensions of the interface.

5.1 Cemeteries and Memorial Parks in Second Life

First case is the cemeteries and memorial parks in the Game virtual world Second Life (SL). There are several cemeteries in SL where residents can allocate a virtual grave to recall the memory of their dearest as well as bury their avatars that will not be operative in Second Life any more. Haverinen (2014) has studied the social online mourning as a contemporary practice that, as she states, has transform the web into a new space for mourning and honoring.



Figure 5. Picture taken in 2012 in a cemetery in Second Life.

This picture has been taken in a cemetery in Second Life. In the foreground, on a gravestone with the form of two books the inscription "7/12/99-16/6/2000 an Angel on earth" can be read to recall the memory of a six months dead baby. In the background there are some other graves, one of them is for an Avatar. The symbolic implications of this virtual space can help to understand how the mental-emotional space between the physical and the virtual is experienced.

Regarding narrative dimension, this particular virtual space refers to the memory of a dead person, which is a physical world contingency and its emotional consequences lie in the physical space symbolic system, because gravestones are funeral landmarks. Therefore, meaningful actions, such as visiting a virtual memorial space or burial space, situate the action outside the virtual world, and it cannot be understood without the physical dimension that is attached to this virtual ritual.

With respect to representational dimension, the whole imagery created in the virtual space is in great debt with a long burial representational tradition, to which elements like arched gravestones, crosses, angels, flowers, fences, walls... belong. Then again, the photography of the dead baby which appears in the gravestone is a mediated picture of a physical space. As a result, it can be said that the appearance of this virtual space is a complex compilation of visual symbols which find their origin in the physical space but that actually make sense as a part of a hybrid mental-emotional experience of space.

As regards the interactional dimension, it can be said that is slightly mediated. Navigating space, focusing the camera on an object, or constructing virtual 3D objects are codified actions performed through a keypad. The interaction model that is used in SL is closer to virtual space than to the physical. Although the subject navigates a virtual world, the action of visiting a memorial landmark, more than enclosing it to the virtual or physical worlds, places it in what this paper suggest being an emersive mental-emotional Space.

5.2 Peacemaker, the Game



Figure 6. Game interface of Peacemaker, image courtesy of ImpactGames

Peacemaker is another case of blending life and game as well as physical and virtual space. The game is a government simulation on Israeli-Palestinian conflict. The player has the choice to play the role of the governor of one of the two countries. As the content of the game and the pictures have been taken from the real conflict, the narrative dimension is highly emersive, although in the other two dimensions it is an immersive game.

With regard to the narrative dimension, every action that is described in the game is based on real events, documented by newspaper and other media. This places the action outside the game and changes the orientation of the game content inside out. It is also worthwhile mentioning that this game raises awareness about the plight of the Palestinian people and informs about the Palestine-Israel conflict, showing it as a complex matter.

With respect to the representational dimension, it must be mentioned that the map and the world of the game is a representation of the real territories of Israel and Palestine, which also increases the reality of the game. In relation to the interactive dimension, it is mostly immersive, for the game is played with common human-Interaction devices, such as mouse and keyboard.

5.3 Zombies Run!



Figure 7. Game interface of *Zombies, run!*, image courtesy of Six to Start and Naomi Alderman

Finally, a gamification of running called *Zombies run!* will be examined. This recreates a situation after a zombie catastrophe in which some runners risk their lives running among zombies to collect objects. In this case, though the narrative is immersive, the interaction with the game is emersive, for it consists of running in the streets while listening to a radio emission that informs about zombies nearby.

With regard to narrative dimension, the story that is being told in the game and that the player listens to using earphones connected to the smartphone is very immersive. The player acts the role of a runner called runner five, in a post-apocalyptic fictional world, where runners are selected to footrace outside bases collecting objects and food that are essential to survive inside those fortified bases.

In respect of interactional dimension, a different situation occurs. The player runs actually along real streets, parks, or paths. The interaction is mediated by a location aware device, that takes the location of the player as the main input. This way, the whole territory is turned into a playground of the game. Finally, the effects of the game, such as getting fit and healthier as a result of running, belong to everyday life and physical space, rather than to virtual space. Therefore this can be addressed as an gamificated process, for a non-ludic action such as running has been turned into a ludic process that has a measurable output into the real life.

6. CONCLUSION

The experience of playing constitutes a mental-emotional space that is determined by many aspects (cognitive, cultural, symbolical, emotional, etc.). It can, depending on variables of

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narrative, representation and interaction, be placed in the virtual or in the physical space. Denying real/virtual dichotomy but admitting that there are more than two spatial realities, this paper offers the seeds of a theoretical framework to analyze how the subject's spatial perception and awareness depends on spatial involvement.

The key to new spatial realities is in the role of interface, where little changes can orient the game content emersively to the physical space or immersively to the virtual space. Therefore, new spatial modes of experience can be generated by connecting physical and virtual spaces in different ways. Nowadays, the hybridization between physical and virtual space has allowed players to get involved in the space of giants as much as they can stay in the scope of the mills. The interface prolongs the sense of the action beyond the boundaries of space, creating an emersive experience of the space. Immersion only describes partly the experience of the player. There is also an experience in which the game gets out from both its virtual and conceptual boundaries and takes place in the physical space, altering or transforming it, and transferring its virtual content into the ordinary life. That experience of being surrounded by the game instead of entering it has been proposed as emersion in this paper. Further studies, that are part of a PhD Thesis, will focus on the concept of emersion, as a phenomenon that may be the common ground of mixed reality games, serious games or gamification. Additionally, the proposed analytical model will be developed to be applied to any particular game and determine if its emersively or immersively oriented.

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