NEW MEDIA STUDIES

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THE AGE OF PLAY

NEW MEDIA STUDIES:
The Age of Play

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The Ludic Century is an era of games. When information is put at play, game-like experiences replace linear media. Media and culture in the Ludic Century is increasingly systemic, modular, customizable, and participatory. Games embody all of these characteristics in a very direct sense.

Increasingly, the ways that people spend their leisure time and consume art, design, and entertainment will be games - or experiences very much like games.

(Zimmerman 2013).

In September 2013, influential game designer Eric Zimmerman wrote his manifesto about the so-called Ludic Century. In it, he heralds the coming of a playful century where everything is defined by games. Games and play will become omnipresent, noticeable in every corner of society. In this edition of the New Media Studies Magazine, we have moved from visual culture to playful culture. In this edition, we would like to introduce you to the broad field of play.

As Zimmerman argues, play is everywhere. From serious games in health care to gamification in business. Even politics is undergoing a ludic turn. Play isn't only connected to games, and in this edition of the magazine, we would like to play the game of play with you. As you read this magazine, with every chapter, a next level is achieved. Every level of this magazine of play provides you with a new angle, a new perspective on games and play, unlocking more knowledge as you read.

The papers presented in this magazine, are selected from two courses of the New Media and Digital Culture master's program. Most papers have been selected from the Game Studies course by Joost Raessens, but you will also find papers selected from the Software Studies course, given by Ann-Sophie Lehmann. By not only selecting papers from the Game Studies course, we can show you how the concept of play has already found itself in different academic areas.

Level 1 is where we start with a common concept of play; a game. In this case, Lara Coomans talks about the videogame Minecraft. The game however, is discussed from a software studies perspective. This means that in level one, Lara plays with the idea that the non-photorealistic visuals of the game and the underlying techniques to create these visuals, afford creative play, which is the key feature of this incredibly successful game.

Moving on to level 2, we find ourselves in another level of visuals, the world of the Oculus Rift. By looking at game design, game development as well as technical game research, Menno provides us with a realistic image of the Oculus Rift and the possibilities of future gaming. As we have now achieved more technological knowledge in the gaming field, and having looked at games from a more software studies perspective, it is time to move on to another level. From here on, we look at subjects through the lens of game and play.

In level 3, Antje Ziska focuses on the subject of identity. Tapping into the works of Jos de Mul, she adds to the discourse of ludic identity: the idea that we construct our identities in interaction with game content. In her article, Antje describes how playing The Sims may construct the players identity, and how in turn The Sims is a ludic reflection of the player's own identity. As we find ourselves in the realms of identity, we move on to level 4.

Here, Mara Vandorou also taps into the idea of identity construction through playing games, but approaches it from an entirely different angle. As you might have thought you had unlocked the level of identity, level 4 is here to change that. In her article Mara focuses on the aspect of education and shows how epistemic games can help construct a professional identity of our current young digital natives.

Related to applied gaming such as epistemic games, is level 5, where we move on to the so-called exergames. Critically discussing theories of Ian Bogost, Emma slays the zombies of level 5, and runs with the idea that narratives can be used as a rhetoric tool to get people to exercise with games.

Leaving zombies behind, we will now portal to level 6. Here, Kevin Willemsen enters the world of politics from a playful angle. Moreover, Kevin argues how we need gamification to understand the complex systems we find in politics.

Where Kevin has helped us unlock the understanding of gamification, in level 7, Ben Borrow critically discusses this idea, and how it has been implemented in, for example, marketing.

In level 7 we burst myths and provide tools for the future of gamification. We have unlocked level 1 through 7 as we enter yet another world we can see through the lens of play. In level 8, Stephanie de Smale brings us back to the manifesto of Eric Zimmerman, as she shows us how the hacking of and tinkering with a 3D printer is part of a tension towards a ludification of culture.

What all the articles have in common, is that they show how the concept of play opens up a variety of subjects and research fields to be discovered in a new light; that of play. This magazine

shows how hacking, politics, health, education, visuals and identity can all be discussed through play. Research on Games and Play is an emerging academic field, which means there is not yet a lot of focus on studying these phenomena in varying disciplines such as humanities, social science or computer science. There is good news though, as Utrecht University is organizing an interdisciplinary Summer School on Games and Play research! More on this later in the minigame in this issue.

As you have opened this e-book in front of your screen, we want you to come and play. Play with the academic ideas and questions that are posed within the articles. Join the players that have written the articles in battle, and reach the next level with every chapter. Unlocking the field of play along the way.

Works cited

Zimmerman, Eric. "Manifesto for a Ludic Century". In Steffen P. Walz & Sebastian Deterding (eds.): The Gameful World: Approaches, Issues, Applications. Cambridge, MA: MIT Press, to appear 2014. <http://ericzimmerman.com/files/texts/Manifesto_for_a_Ludic_Century.pdf>.

YOU PASSED THE TUTORIAL
GO TO THE FIRST LEVEL
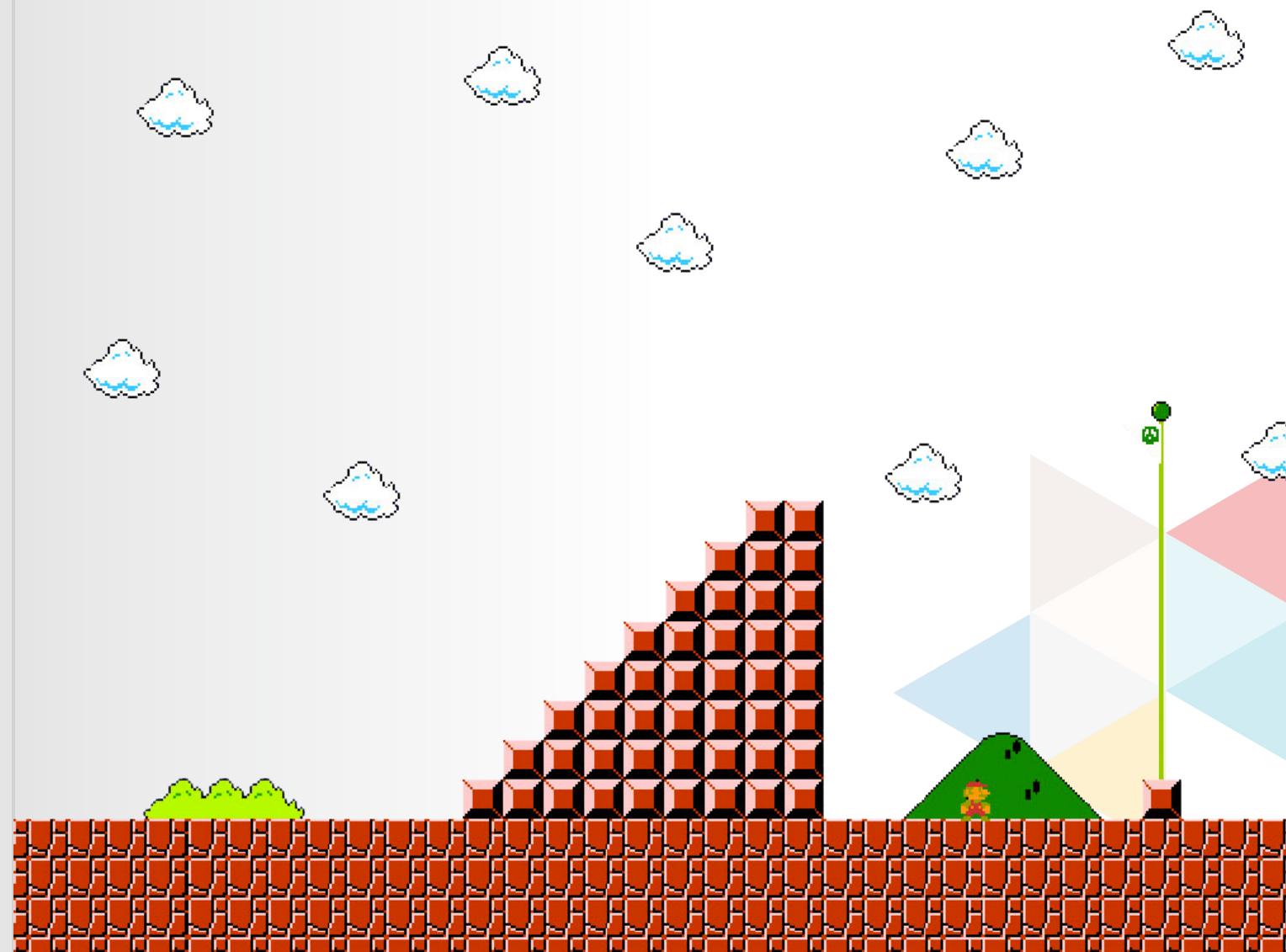
LEVEL 1

LARA COOMANS

NOT BEING SQUARE BY BEING SQUARE:
A PAPER ON NON-PHOTORE-ALISTIC RENDERING, MINECRAFT, GAMEPLAY AND CRAFTSMANSHIP.

ABSTRACT - This paper discusses the game of Minecraft, its rendering techniques and gameplay within the field of non-photorealistic rendering (NPR). Studies on NPR focus mainly on the level of communication of non-photorealistic images that 'remediate' existing artistic techniques like pen-and-ink drawings. Minecraft's graphics however, are similar to graphics of old video games or may even remediate plain old LEGO. Instead of communicating certain information, the NPR of Minecraft affords something different: craftsmanship. This in turn affords creative play. This paper concludes that due to these different affordances of NPR in Minecraft, the focus of the field of NPR should be expanded with a new category that includes the effects and affordances of NPR on craftsmanship and gameplay in videogames.

Introduction: A square sandbox

Square pigs with square noses, square trees, square zombies, square mountains. An endless square world, where the only limit is your own imagination. Even though Minecraft is called a sandbox game, there is no sign of traditional in-the box way of thinking when this game was developed. Even though the game *Minecraft* may look square, it definitely is not square.

Minecraft is a so-called *sandbox, voxel-based* indie game, developed by Markus "Notch" Persson and later released by *Mojang*. An alpha version for PC was released in 2009, in 2011 the full version came out and quickly became wildly popular after that. Having received several awards and having sold over 33 million copies over all platforms, "Notch" can state that an incredibly successful game was made (Thomas 2011). Since then, many 'clones' of the game have been developed, with very similar blocky graphics. A new voxel-based game genre is emerging.

The game world of Minecraft is made entirely out of big 3d cubes. These are called volumetric pixels, or *voxels*. Even though the game looks like it is entirely made out of voxels, the game graphics are actually made with *polygons* (connected lines and vertexes) that look like voxels. This means that the blocky *voxelated* retro look of Minecraft is an intentional aesthetic choice, and not a technical limitation. In sales (and with that, likely in popularity as well) Minecraft on the Xbox 360 stands right besides new games like GTA V, Call of Duty: Black Ops and Halo 3. But when it comes down to the game graphics, they couldn't be more different.

Games like *GTA V* and *Call of Duty* fit right within the current paradigm of an on-going strive for more photorealistic graphic in games (Wolf and Perron 2003, 47; Haller 2004, 1). This photorealism also applies to the rendering of physics in computer graphics. We notice a similar tendency of more and more natural and realistic movements and physics in graphics and in games. When looking at the technical papers presented at the SiGGRAPH Conference of 2013, you'll see beautiful developments in physics based, realistic simulations in computer graphics (Stomakhin et al. 2013, Bradley et al. 2013).

Minecraft however, does not show any photorealistic graphics, nor does it have a realistic physics engine. Could Minecraft then 'fit' in the techniques and graphics of *non-photorealistic rendering* (NPR)? This term was first coined by Winkenback and Saleson in 1994, in their paper on computer-generated pen-and-ink illustrations. The non-photorealistic rendering techniques are used for the production of both 2d and 3d images and animation. The term focusses mainly on the art of making computer images look hand drawn, painted or cartoonish looking. Also architectural

Figure 1: Screenshot of Minecraft's blocky graphics

images and scientific visualization are examples of computer graphics in which non-photorealistic rendering is used (Gooch and Gooch 2001, 2). Next to this, NPR is also used in films as Waltz with Bashir from 2008 and in videogames, such as *Zelda's Wind Waker*, also from 2008. Most studies on NPR focus on the technique of making graphics look like they're hand-drawn, a remediation of existing (analogue) artistic techniques almost. But what does it mean when a non-photorealistic game uses a different kind of NPR, one that doesn't look like a painting? What happens when game looks (or is even remediating) an old game or just good old blocks? Does Minecraft simply fit within the category of NPR just because it doesn't look photorealistic? Or could we see the blocky, voxelated graphics in Minecraft and its clones as a separate kind of non-photorealism? And more importantly, since we are talking about a game, how does NPR affect the gameplay or vice versa?

This paper focusses on the field of NPR and on Minecraft's graphics and gameplay to be able to see if Minecraft (and the entire voxel based game genre for that matter) could fit within this particular field, or that Minecraft deserves its own category in (non)photorealistic rendering of computer graphics.

In order to do that, the first chapter of this paper briefly discusses the photorealism paradigm, NPR techniques and uses and how these two differ from each other. This difference may look self-evident, but since the term NPR only covers what is *not* (i.e. *non*-photorealistic) instead of what is, it is necessary to have a good look at both terms. This first chapter reviews literature on the subject for a better understanding of the term NPR before the game Minecraft can be discussed within the field of NPR. It describes the different categories, uses, effects and affordances of NPR as described by Gooch and Gooch and Slechtweg and Strothotte in their books on NPR. It also

reviews the articles of Isenberg, Haller and Masuch and Röber on the effects of NPR on the viewer.

The second chapter discusses the game Minecraft and the technical aspect of using voxels and polygons for the 3d modelling and rendering in order to examine the technique that lies behind the graphics of the game.

The third chapter describes the gameplay, which mainly exists of mining and crafting, as the title of the game may already reveal. This chapter also studies the relationship between the graphics and the gameplay. Here, the concept of craftsmanship is introduced, as this forms a key concept in Minecraft's gameplay. In this paper the brief description of the game Minecraft is used as an example, not an in-depth case study of the game. The discussing of Minecraft in relation to NPR serves as a conceptual framework for looking at non-photorealistic rendering and gameplay in general.

The fourth chapter examines Minecraft's non-photorealistic graphics and the concept of craftsmanship and gameplay in relation to the aforementioned studies of NPR in order to discover Minecraft's position within the field of NPR. This last chapter argues that Minecraft does not fit within the concept of photorealism, nor does it quite fit within the field of NPR. The reason for this is that the NPR of Minecraft doesn't afford guiding the viewers or communicating stories or details like it normally does. The NPR of Minecraft affords a different thing: craftsmanship and creative play, resulting in a need for a new category in the uses and effects of non-photorealistic rendering.

A different atmo*sphere*: non-photorealistic rendering

Before we look at the game, this chapter briefly discusses the photorealism paradigm in computer graphics and in game graphics, but mainly focuses on the concept of Non-Photorealistic Rendering (NPR) and its variety of uses.

As stated in the introduction, we currently find ourselves in a photorealism paradigm in computer graphics. Graphics in film, graphics in games and in scientific images are indistinguishable from a photograph or even from reality. Not only in images but also in physics-based computer generated animations and simulations. With ever developing technology, 'artists' of computer graphics can now recreate incredibly complex natural phenomena and movements, like the alteration of light, the falling apart of a snowball or the falling of the leaves when wind hits a virtual bush. These rendering techniques are intensively used in films but also in games. Here, photorealistic environments are rendered in real-time, meaning that algorithms can compute a realistic environment around the player as you walk through the game. And even though the developing technologies that enable us to render such realistic graphics remain highly interesting and useful, an increasing interest in non-photorealistic rendering of images is emerging.

First of all, it is important to note a few difficulties that come with the term NPR. As Anna Vilanova states in her course on NPR, the term is problematic because it is a study of *what is not*, instead of what is. 'Non-photorealistic rendering is the means of generate imaging that does not aspire to realism. It is difficult to express what exactly it is, therefore it is easier to express what it is not' (Vilanova 2002, 1). Leaving us with questions such as: if something is not non-photorealistic, is

it therefore photorealistic?

Thomas Strothotte en Stefan Schlechtweg also note that the term non-photorealistic can be problematic, in the sense that this broad term actually covers several points of view on the subject. For example, process of image production, the freedom of not having to produce appearances of object as they are, specific drawing styles and the effects of rendering on users (Strothotte and Schlechtweg 2002, 10-11). But, right because it covers (the production of) *all* computer generated images that do not serve the goal of simulating reality, the term non-photorealistic rendering is a term that is internationally and intensively used, and will also be used in this paper.

Photorealism has paved the way in the field of computer generated images. When looking at the quality of computer generated realistic images, they can easily be judged by how closely they resemble a photograph or even reality (Gooch and Gooch 2001, 1). When it comes down to the quality of images of which there is no goal to resemble reality, the judging becomes more difficult. An image is not 'better' when it is highly unrealistic. As Gooch and Gooch state in their book on NPR, an important part of judging non-photorealistic images is looking at how effectively they *communicate* (Gooch 2001, 2). They separate the broad field of research of NPR into three categories, being artistic media simulation, user-assisted image creation and automatic image creation. Where artistic media simulations focusses on the physical properties of an artistic medium (such as pen and ink, or pencil drawings), user-assisted image creation discusses the guiding of software users in creating artistic images (enabling non-artists to make images with a hand-crafted look) and lastly automatic image creation focusses on automatically producing images with a predefined communication goal (Gooch and Gooch 2001, 2). Next to Gooch and

Gooch, Tomas Strothotte and Stefan Slechtweg also have devoted themselves in writing an in-depth study of the entire field of NPR, resulting in the book from 2002 *Non-Photorealistic Computer Graphics: Modeling Rendering and Animation*. They too emphasize on the difference between photorealism and non-photorealism in computer graphics. Stating that NPR does not focus on the quest for realism, but instead has created a new quest: creating imagery that is not only useful but also beautiful (Strothotte and Slechtweg 2002, vii). Strothotte and Slechtweg distinguish several 'visions' for which NPR should be used: medical and scientific illustration, technical illustration, archaeological illustration and storytelling. Overall, studies on NPR focus mainly on the different kind of rendering techniques that can be used for these 'visions', all emphasizing the fact that realistic images can show beautiful and complex information, but that communicating this information in a comprehensible way calls for an abstraction of the images. With an abstraction of an image, NPR affords guiding the viewer to certain details or places in the image (Santella 2004, 77). Gooch, Isenberg, Santella and Mandryk have also studied the emotional response and psychology of NPR on viewers. Showing that viewers may respond less emotional to an abstracted image (Mandryk 2011, 14), but that when it comes to communicating specific details, NPR can be very useful (Isenberg 2006, 126; Gooch and Gooch 2004, 39).

But, both books on NPR and the studies of Isenberg, Santella en Mandryk on the psychological effects of NPR mainly focus on 'hand drawn' computer generated images. Many studies have examined the rendering of either pen-and-ink and pencil drawings, on simulating brushstrokes or other existing artistic techniques like the cartoonish looking style of cell-shading (Card and Mitchell 2002, 319). Even in technical illustrations and 3d models, the main focus

lies on computer generated 'hand drawn' images (Isenberg 2006, 115). In their article on how to evaluate NPR, Peter Hall and Ann-Sophie Lehmann also mention this link with existing art, again focused on different kinds of existing artistic schools. In the studies of NPR, there seems to be little attention for graphics that do not look realistic, but do not look like they're hand-drawn or painted either.

The field of NPR has recently expanded from the scientific and artistic field into the field of videogames. Michael Haller states in his article that with the techniques that are available for realistic rendering, stylized rendering can be done as well. A wide range of non-photorealistic real-time rendering, such as the aforementioned cell-shading is now available (Haller 2004, 5). In their article on NPR in games, Maic Masuch and Niklas Röber state that game designers strive for photorealistic graphics and physics in videogames in order to create a sense of immersion while playing the game. However, this immersion could be seen as a fragile bubble, which bursts as soon as something is slightly less realistic. Therefore, when a game uses NPR, something slightly unrealistic is less bothersome, since the entire game is non-photorealistic. Meaning that the immersion while playing an NPR video game can be even stronger, or at least have a 'smoother feel' than a photorealistic game (Masuch and Röber 2004, 6). In her PhD thesis in 2002, Allison Klein has focussed on the real time rendering in virtual environments, but again, like Haller and Masuch, she focuses on NPR that could be seen as a remediation of artistic techniques like (cartoonish) drawing or painting, both in 2d and 3d (Klein 2002, 43). But what happens if a virtual environment doesn't look photorealistic, nor does it look like it is hand-drawn, cartoonish, or any other (analogue) artistic technique? What happens if a game actually looks non-photorealistic because it

has the look of an old computer game or even plain old children's blocks or LEGO? This chapter has elaborated on the different techniques and uses of NPR. In NPR there is no use in looking at how 'unreal' it is, but in NPR, the main characteristic is that it can be used to communicate ideas or information in a comprehensible way. Few studies however, have focussed on the non-photorealistic look of videogames and its effect on gameplay. The studies that do focus on NPR and gameplay, seem to concentrate on the remediation of existing (analogue) artistic techniques, but not on any other kind of non-photorealism. The following chapter therefore discusses the technique behind the blocky pixelated NPR of Minecraft which doesn't resemble analogue artistic techniques like pen-and-ink drawings, but does resemble the look of blocks or LEGO.

Triangles and squares: Minecraft's rendering

In the beginning stages of videogames the non-photorealistic graphics of games were a result of limited computing techniques. A pixelated or voxelated look of videogames was simply the most realistic image a developer could render. But what happens if a new game like Minecraft actually mimics the look of these old computer games? Does Minecraft still work on these old techniques? And how do the blocky graphics affect the gameplay? Before being able to answer these questions, we need to take a look at the game itself. Therefore, the next two chapters describe the game Minecraft; the 3d modelling techniques and rendering and then its gameplay.

Minecraft is built entirely out of 3D cubes, hence the name *voxel-based* game. A *voxel* (short for volumetric pixel) represents a data point on a three-dimensional grid. In other words,

a voxel is essentially the 3d equivalent of a 2d pixel. 'Each voxel can store attributes describing the material they represent, such as density, colour and opacity'(Prior 2006, 263). The ability to store multiple of these attributes, is what makes voxels an intensively used format for visualization and analysis of scientific and medical data, for instance from a CT or MRI scan. But, as will be described next, voxels are also used as a format for building 3D games (Johnson 2013).

In games, voxels are mostly used to create a landscape or to represent a certain type of terrain because of the characteristics described above and because of the possibility to write a lot of detail into a single voxel, after which you can assemble them in any way you like, making it perfect for landscaping (Baszucki 2011).

Using voxels as a format to building 3D games is not a recent development. It has already been done in the early nineties by 'voxel pioneer' Ken Silverman, but voxels were quickly taken over

Figure 2:Polygons (left) and Voxels (right)
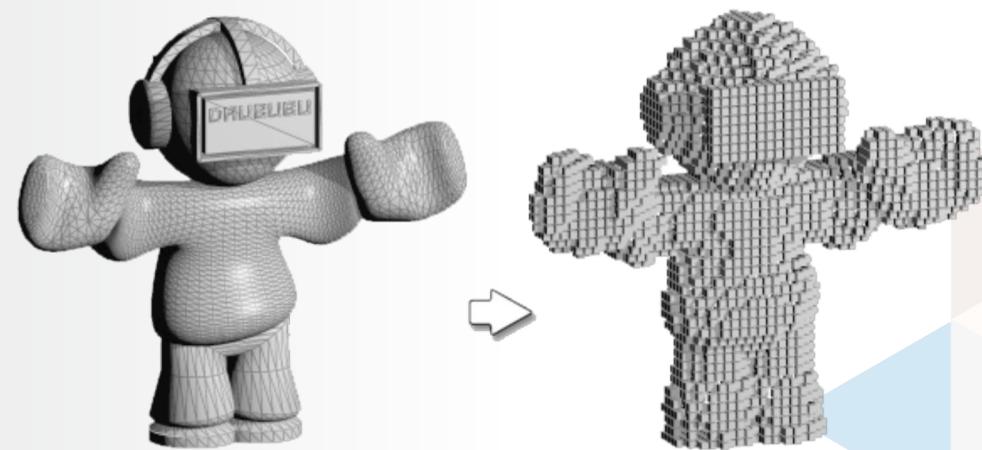
by the use of *polygons/vertexes* (Johnson 2013). A polygon graphic is created by connecting points in space (*vertexes*) and connecting them together with lines (Pickton 2012). Figure 2 shows the difference between the use of polygons (left) and voxels.

The reason why voxels were taken over by polygons leads us to a big disadvantage of voxels. In order to create a detailed image you would need a great amount of voxels. Since one voxel can store multiple attributes, using many of them would take a lot of computing, rendering and memory storage. Avoiding this would result in using less, but bigger voxels, displaying a very abstract blocky image (Baszucki 2011; Pickton 2012). Like in Minecraft.

Technically speaking however, Minecraft is *not* a voxel game. It is made with polygons, looking like voxels. It is a voxel-*based* game in the sense that it indeed uses 3d cubes, but in fact it does not run on a voxel engine. The blocky look of the game is therefore not a result of the described technical limitations of voxels, but is actually an intentional aesthetic choice. As the aforementioned Haller wrote in his article, modern rendering techniques are used to render stylized graphics in games, which is also done in Minecraft.

One could think that a very abstract, voxelated game would limit the player in either their gameplay or expressing their creativity. With Minecraft however, the result is the exact opposite: the 3d blocks actually afford endless possibilities of mining and crafting objects and structures.

Mining and crafting blocks: Minecraft's gameplay

This chapter gives a general overview on the gameplay of Minecraft. The basic elements of the gameplay discussed in this chapter are derived from occasionally playing the game, but mainly from the Minecraft Wiki, which contains all the information on how to mine blocks and how to craft objects.

Minecraft is called a sandbox game, also known as an open-world or free-roaming game, meaning that the player can freely roam around in, and even change, the game world. In Minecraft, the player has a lot of freedom in how to play the game, since there are no specific goals to accomplish. The gameplay exists of exploring your infinite procedurally (or algorithmically) generated surroundings from a first person's view, *mining* materials (blocks), *crafting* objects with these materials, and building constructions. The basic units of structure in the game are called *blocks*. They build up the in-game environment and you can mine and utilize them (Minecraft Wiki 2013, Blocks). For example, by mining the blocks from a tree, you'll obtain blocks of wood. If you mine the entire tree, it will give you a minimum of 5 blocks of wood, and 1 block of leaf. This may vary depending on the size of the tree. Figure 3 shows a selection of different kinds of blocks that can be mined and crafted. You can play the game in either *Survival Mode, Creative Mode* or *Hardcore Mode*, and soon in *Adventure Mode* which is still to be released. In survival mode, the player has to deal with health and hunger bars, and at night, monsters, 'creepers' and zombies spawn who will attack you. By building shelters with your blocks you can keep yourself safe. In creative mode, the player has infinite health and infinite blocks and tools. The survival aspect has disappeared, enabling the player to freely create and destroy structures within the game. The same monsters appear at night but are a less likely to attack you. Hardcore mode has the same elements as survival mode, but if you die in this mode, you'll spawn in a completely new world, where all your work is lost and where you have to start from scratch (Minecraft Wiki 2013, Gameplay).

As the name of the game may already reveal, next to the mining of the material, *crafting* is one of the main elements in the gameplay. The materials that the player can mine may be useless until you craft something with them. The crafting of objects is in a sense a very logical process. For example, if you'd like to have a stone pickaxe in order to mine something (your arm is your only tool when you first start playing), you need to mine wood and stone. In your crafting menu, you can then craft it into a pickaxe. In this crafting menu, dragging your obtained blocks into the menu in specific patterns and quantities will give you different objects, new materials and tools. For example, for a pickaxe, the following steps have to be made. First mine wood and stone from
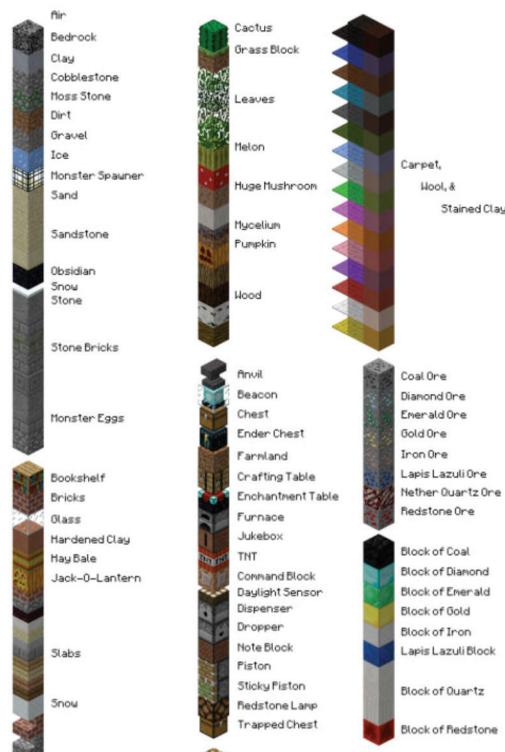
Figure 3: Examples of Blocks in Minecraft
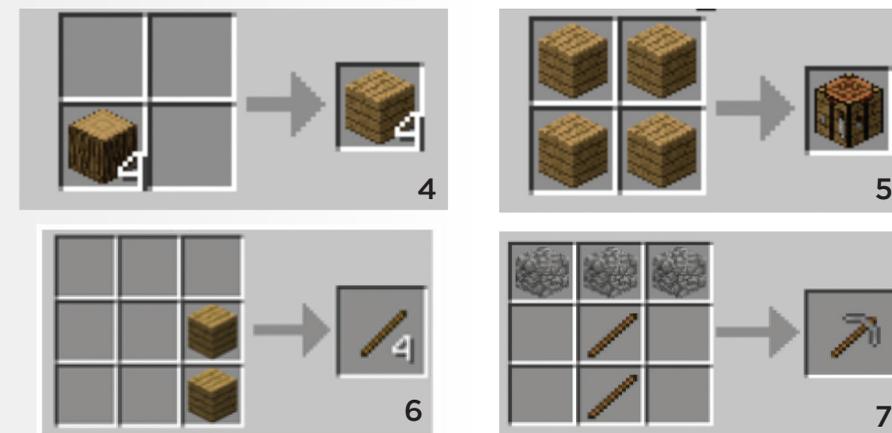
Figure 4: Craft planks from wood blocks
Figure 5: Craft crafting table from planks
Figure 6: Craft sticks from planks on your crafting table
Figure 7: Craft stone pickaxe from sticks and stone on crafting table

your surroundings, then go to your crafting menu, and then craft the following objects as shown in figure 4 to 7.

In general, not only the graphics of the game are non-photorealistic, the physics are non-realistic as well. For example: when starting the game, your only tool is your hand, which you can chop down a tree with, and when you chop down the bottom block of a tree, the tree levitates in mid-air. Next to that, in creative mode, the player has the ability to fly and you can ride a boat *up* a waterfall, using it as an elevator.

What is remarkable, is that both graphics and physics are non-(photo)realistic, but that the crafting process can be seen as a quite realistic process. It is realistic in the sense that some materials might take longer to obtain, or certain tools are specifically useful for different types of blocks. The main realism in the game is in the craftsmanship. You'll need sheep for wool, and you

need wood and wool in order to make a bow. You'll need feathers from a chicken, wood and stone in order to make arrows.

These two chapters have discussed the fact that Minecraft actually uses polygons in rendering its graphics, therefore showing that the non-photorealistic blocky look is not a result of the limited technique of using voxels. It is an intentional choice to look non-photorealistic. One could even say that the 3d blocks of Minecraft simply remediate the (LEGO)blocks we used to play with as children. Next to that, this chapter has discussed the gameplay which shows that the main focus of the game is not only mining, but mainly crafting. Crafting tools, objects and structures, and in survival mode: surviving whilst doing that. When it comes down to the physics, the game is non-realistic as well, except for the crafting process, which requires realistic thinking about what materials are needed in order to craft a specific object. Having discussed the game, we could conclude that the crafting process is a key concept in in both gameplay and realism in the game. It is now interesting to look back at the concept of non-photorealistic rendering, crafting and gameplay and how these three affect each other.

A love triangle: NPR, craftsmanship and gameplay.

To be truly able to state something about the effect of NPR on craftsmanship and gameplay in Minecraft, an in-depth analysis and testing is required. Letting people play the game and then asking them questions on the subject could be a way to research the effects of NPR on gameplay. This chapter tries to provide a conceptual framework in which we could start thinking about the relationship between the two.

Bjarke Liboriussen writes in his article about the relationship between craftsmanship and play. According to Liboriussen, Roger Caillois claims that play is the opposite of work, but he himself argues that craftsmanship has two characteristics that can be found in both work and in playing computer games. Firstly:

> Craftsmanship entails patient, material consciousness: the creative, possibility-widening attention to the material at hand pleasurably builds up through rehearsal and based on the temporary suspension of goal-directedness
>
> (Liboriussen 2013, 282).

Secondly, he states that craftsmanship entails the satisfaction of seeing the end result of one's labour (idem). Both characteristics seem to apply to Minecraft. The gameplay requires patient, material consciousness in the sense that every single block has to be carefully mined and crafted. Each structure that is build, has to be build block by block, and is almost never truly limited by lack of resources. Thus enabling the player to be creative in what materials they are using, and what they want to build with them. As for the second characteristic, the Minecraft community shows us that the players are intensively sharing, both in and outside the community, what kind of elaborate structures they have made in the game (Lastowka 2012, 9) As game developer Margaret Robertson writes in her article on her first experiences with playing Minecraft:

It means that when the sandbox possibilities do start to open up -- of building and exploring [...] you are deeply embedded into the world. You have a skill-set, a sense of ownership and belonging, which fuel you through the challenge of free, creative play. And that's crucial, because free, creative play is actually quite a grueling prospect, full of the pain and effort of making and losing

(Robertson 2010, 3).

She too elaborates on the effects of element of craftsmanship in the game. The game contains so much more than just building with digital blocks. It has built an entire new way of playing, crafting and satisfaction in gameplay.

And exactly at this point, it becomes interesting to look at the question of why this game affords craftsmanship. Sean Duncan argues in his article on Minecraft that it is the threat of the nightly monsters in both play modes that afford building constructions: "nothing in the game tells you that you need to create large, elaborate structures, but the game does quickly encourage you to make *something*" (Duncan 2010, 7). In their paper on children's collaboration in emergent game environments, Marklund, Backlund and Johannesson also note that the game doesn't award the player for creating and building structures. They state however, that

players naturally tend to start using the opportunities for creative outlet that the game supplies them with to plan, devise and create monumental structures, cities, re-enactments of famous movie scenes, sculptures and artwork

(Marklund, Backlund and Johannesson 2013, 308).

In this chapter however, I'd like to argue that this craftsmanship does not happen naturally, nor that it is only the gameplay that enhances the craftsmanship, but that it is mainly the NPR of the game that affords the creative craftsmanship, and therefore the creative play.

The aforementioned article of Masuch and Röber focuses on the effects of NPR and play. As stated in previous chapters, non-photorealistic games too can feel immersive, right because there is no fragile 'bubble' of realism that can easily burst (Masuch and Röber 2004, 6). However, Masuch and Röber mainly focus on the idea that NPR guides viewers to a specific details in the graphics, or that it is a very useful way of communicating a certain story. These affordances of NPR are also mentioned by Gooch & Gooch, Strothotte and Santella, as mentioned in the first chapter. It is remarkable that the NPR of Minecraft does not seem to line up with these affordances of NPR. In Minecraft, the stylized graphics and non-realistic physics afford craftsmanship. With its uniformity of blocks, its procedurally generated surroundings and therefore its unlimited resources and space, it is almost impossible not to start crafting. Even though Sean Duncan writes mainly about effect of the survival mode on the creative gameplay, he makes a striking argument when he compares Minecraft with the unlimited imagination and creativity of playing with LEGO. He states that 'beyond simply appearing "blocky," the game's uniformity of meter-square elements is a visual allusion to LEGO™, and suggests a space in which the player is given free rein to create whatever he or she wishes from the pieces provided (Duncan 2011, 4).

And with this quote, we return to the aforementioned 'remediation' of existing artistic techniques in NPR. Where Gooch, Strothotte and Winkenback may have been writing about pen-and-ink drawings, brushstrokes and pencil drawings, they seem to have forgotten their childhood creativity when playing with LEGO. The NPR of Minecraft not only takes us back to the computer graphics of old computer games, it takes us back even further. Back to building with blocks. Like Robertson states in her article, Minecraft is an incredibly well designed game, which goes far deeper than just making it look like LEGO (Robertson 2010, 3). As discussed in the chapter on voxels and polygons, it has been an intentional choice to make the game look and work like it does. Instead of providing the player with a set of limiting photorealistic surroundings and physics, Minecraft's NPR simply gives us a set of blocks and invites us to use our imagination. Minecraft's NPR affords crafting, building, creating; craftsmanship. The tools to actually do this crafting, building and creating are then in turn integrated in the gameplay. And it is this craftsmanship that enhances both creative play as well as satisfaction and pride. This is in turn shared and appreciated by the massive community that surrounds the game.

We have now discussed the combination of NPR, gameplay and craftsmanship in Minecraft and argued that Minecraft's NPR may share the 'remediation' aspect of NPR, in the sense that it intentionally looks like an old computer game or even like good old blocks. However, Minecraft's NPR does not share the same effects, uses or even affordances of NPR as theorists have described. Minecraft's NPR affords craftsmanship, which in turn creates satisfaction, pride and most of all, creative play.

Completing the circle

This paper has examined the game of Minecraft in the light of photorealism, non-photorealism and even craftsmanship by both reviewing literature as well as looking at the game itself. Since Minecraft evidently does not fit within the photorealism paradigm, it does not necessarily mean that it would fit within the field of non-photorealistic rendering. The first part of this paper described the many uses and affordances of NPR, and distinguished that studies on NPR until now have mainly focused on images that simulate existing (analogue) artistic techniques, and that NPR affords the communication of a certain idea or detail. The second and third chapter focussed on the game itself, its rendering techniques and its gameplay. In these chapters, one of the key aspects of the game proves to be craftsmanship. The third chapter tied the first three chapters together, in order to discuss the effect of Minecraft's NPR on its gameplay, and in turn, discussing craftsmanship, NPR and gameplay in general. This paper concludes that Minecraft does not fit within the photorealism paradigm, but does not quite fit within the field of NPR either, because the non-photorealistic graphics and physics of Minecraft afford craftsmanship and creative play. The field of NPR and its effects and affordances should therefore not only be focussed on immersion, simulating analogue artistic techniques and communication, but should be expanded with a new category which includes NPR, play and craftsmanship.

"Photorealism, like pornography, leaves nothing to the imagination".
- Cassidy Curtis 1998, *Dreamworks animator*.

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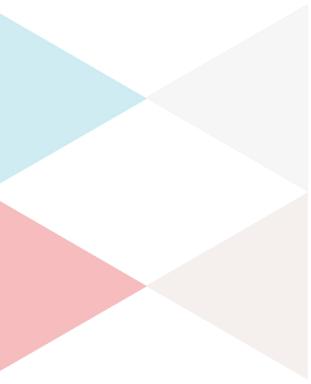
YOU PASSED LEVEL 1
GO TO THE NEXT LEVEL
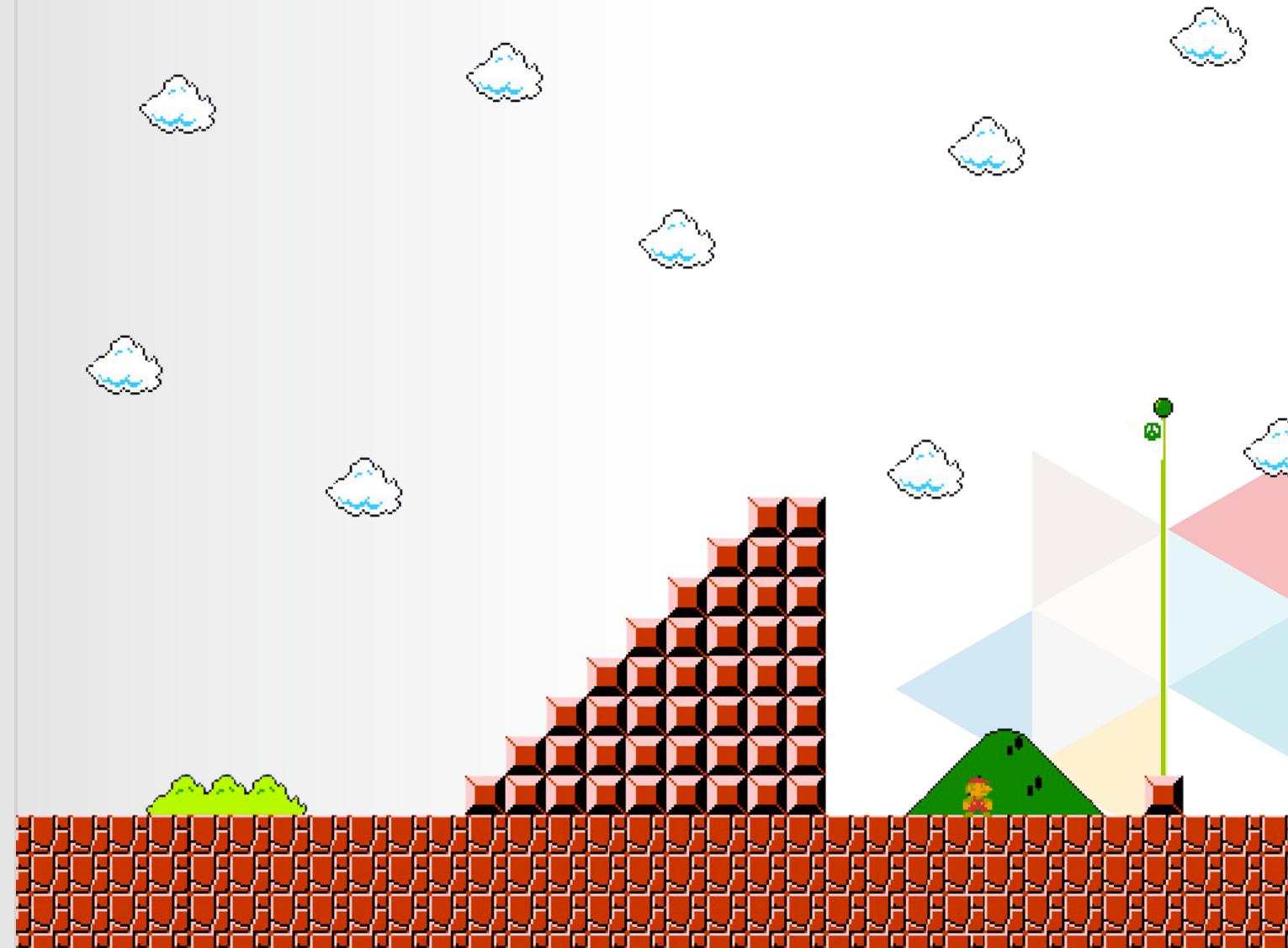
MINIGAME:
SUMMERSCHOOL UTRECHT

The first interdisciplinary European summer school in 'Game and Play research', called Identity and Interdisciplinarity in Games and Play Research, will take place 16-31 August 2014 at Utrecht University in The Netherlands. It is aimed at talented PhD and MA/MSc students who are interested in the study of games and play. It offers students an innovative interdisciplinary platform for learning about games and play that doesn't exist anywhere else in Europe or beyond.

As you've seen in this magazine, the Game and Play research field is very broad. Ranging from politics to education to business, Play in these disciplines is ubiquitous and therefore research is desperately needed. This summer school is an international program and unites seventeen different European institutions in higher education that are specialized in game and play research in order to gain knowledge of the full scope of European scholarship on games and play.

During this summer school there will be lectures given by prominent academics in the field of play and games, including Prof. Dr. Joost Raessens, Prof. Dr. Frans Mäyrä, and Prof. Dr. Mathias Fuchs. In this two-week intensive program you will also attend keynotes by representatives of innovative game companies. The purpose of the summer school is to let students develop their own research ideas while having access to interdisciplinary cutting-edge theories and methodologies from leading scholars in the field.

A typical day consists of three sessions. The first session will be a keynote lecture by senior staff members in which an interdisciplinary overview is given of the field of Game and Play Studies and additional keynotes by representatives of innovative game companies can be attended. The second session will consist of an interdisciplinary workshop with small groups consisting of MA/MSc and PhD students who will work towards a joint interdisciplinary research exercise or game design project, to be presented on the final day of the summer school. The last session will be a separate seminar for MA/MSc and PhD students, reflecting on the earlier sessions.

summerschool UTRECHT

The summer school is interdisciplinary, which means that in the program students will be able to reflect upon different perspectives than what they are used to, making it a challenging and interesting program. The core universities (and thus lecturers) are carefully chosen because of their specific state-of-the-art expertise in teaching Master's and PhD level courses and conducting researching in this area; Utrecht University has specific expertise in new media studies and game technology, the University of Tampere in combining approaches from humanities, social sciences and design research, Warwick University in interdisciplinary methodological standpoints, Eindhoven University in design studies and Leuphana University in digital art and culture.

The articles in this magazine are all situated within the field of game and play research. If you found these articles fun to read, and if you are interested in this field of study, you should definitely consider to apply for this upcoming summer school. The deadline for application is 15th of June. For more information, please go to http://www.utrechtsummerschool.nl/courses/culture/identity-and-interdisciplinarity-in-games-and-play-research or http://www.gapsummerschool2014.nl where you will find exact information about the program's content and lecturers, costs and other practical information.

LEVEL 2
MENNO GOTTMER

HOW TO 'VR' A VIDEOGAME.

ABSTRACT - Many game fanatics have been anxiously waiting for truly immersive virtual reality gaming experiences for a long time. Today, a lot of faith has been put in the Oculus Rift, a virtual reality headset that is supposed to facilitate these immersive gaming experiences by merging the spheres of game design and virtual reality technology. This paper will argue that it is naïve to think that these two spheres can effortlessly merge. Today's video games are designed with a flat screen in mind, but what if the screen is attached to the player's face? In order to answer this question, first, this paper will analyse the issues that arise when virtual reality technology tries to merge with today's video game design. Second, this paper will demonstrate and discuss a chart that clearly illustrates many of the pitfalls of virtual reality gaming on the level of hardware and software design (mechanics), run-time behaviours (dynamics), and emotional responses of the player (aesthetics). This chart is useful for video game designers who want to work with virtual reality technology. Third and finally, this paper will analyse and interpret the possible solutions to the pitfalls of virtual reality gaming and discuss its possible future.
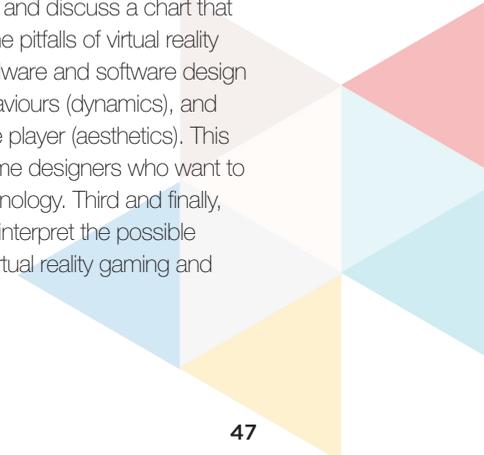
Introduction (A naïve view)

Imagine yourself fighting heroically next to Achilles as you conquer the beaches of Troy. Imagine yourself playing basketball on a faraway planet with your best friends. Imagine yourself piloting a fighter jet as you protect the skies from hostile forces invading your home country. Imagine yourself racing in a Formula 1 racing car at the Grand Prix of Abu Dhabi. This list can go on and on until you literally have no more imagination left. We come across these kinds of utopian visions in the way virtual reality technology is presented. Take a look at the way the 'Oculus Rift' is presented for example: "The Oculus Rift is a new virtual reality (VR) headset designed specifically for video games that will change the way you think about gaming forever […] the Rift provides a truly immersive experience that allows you to step inside your favorite game and explore new worlds like never before" (Kickstarter 2012). Upon reading this, the hearts of gamers around the world must start to beat rapidly, as they have been anxiously looking forward to "truly immersive virtual reality" for a long time. Could this piece of hardware be their Holy Grail?

Popular discourse shows that many people, both consumers and developers, believe the Oculus Rift will finally merge the spheres of gaming and virtual reality (Fincher 2012). While today's virtual reality technology, with the Oculus Rift as its flagship, might indeed facilitate immersive virtual reality gaming experiences, it is naïve to think that these two spheres can effortlessly merge. Today's video games are designed with a flat computer screen or television in mind (Iliff 2012). But what if the screen is attached to the player's face? What are the major game design pitfalls of virtual reality gaming, and how can we avoid them? Nate Mitchell, the vice president of Oculus VR, the company behind the Rift, is very aware of the impact virtual reality

technology could have on today's video game design. In an interview he said: "Now we just need to totally reinvent gaming paradigms in order to use it" (Ohannessian 2013). This paper will explore how far Mitchell's statement is from the truth.

As a method, this paper will incorporate ideas of the "MDA framework", which stands for Mechanics, Dynamics, and Aesthetics. The MDA approach tries to bridge the gap between game design, game development and technical game research (Hunicke 2004). The MDA framework is particularly useful for my own method because it allows me to focus respectively on the software and hardware components behind virtual reality gaming (mechanics), the run-time behaviour of these mechanics (dynamics), and the desirable emotional responses of the gamers (aesthetics), while at the same time linking all of them causally. My method will consist of three steps. First, this paper will do a textual analysis of texts about the mergence of today's video game design and virtual reality technology. By textual analysis I mean a way to evaluate the many meanings found in texts and to understand how they help to create 'social realities' (Brennen 2012, 194). During this step, the procedure will be to pinpoint in several texts, the issues that arise when virtual reality technology tries to merge with today's video game design. Second, in line with the MDA framework this paper will demonstrate a chart that clearly illustrates the software and hardware pitfalls that have been analysed (mechanics), which run-time behaviours they cause (dynamics), and what emotional responses they give the player (aesthetics). This chart can be useful for video game designers who want to work with virtual reality technology, and want to avoid major pitfalls. During the final step, this paper will analyse and interpret the possible solutions to these pitfalls.

Before delving into virtual reality gaming, this paper will first analyse the concept of

virtual reality itself in order to better understand its origin and its relation to video games. There is a certain ambiguous character to this concept that needs to be addressed, and which can be seen in its histories and various implementations. The historical analysis will rely on the articles "A brief history of Virtual Reality and its social applications" (Ebersole 1997) and "Into the Belly of the Image: Historical Aspects of Virtual Reality" (Grau 1999). This chapter is essential to fully understand the interrelation between video game design and virtual reality technology, and as such functions as a logical step to the main analysis of this paper.

Rise and Renaissance of VR

Rise

In general, the popularizing of the word 'virtual reality' is credited to writer, composer, and computer scientist, Jaron Lanier. He coined the term for the first time in 1989, and used it to describe experiences made possible by the latest generation of technologies (Ebersole 1997). There are multiple histories of virtual reality. Some claim that the history of virtual reality was "recent and sudden" (Ebersole 1997), others, such as the art historian and media theoretician Oliver Grau, claim that it is "grounded in a solid tradition within art history" (Grau 1999). The history associated with the first claim focuses primarily on virtual reality in relation to the rise of computer technology, while the latter history focuses more on virtual reality as a "illusionary visual space", which can be seen all throughout art history (Ibid. 1999, 365).

In the article "A brief history of Virtual Reality and its social applications", it is claimed

that the birth of virtual reality was a logical response and a necessity to a world that was insufficiently stimulating (Ebersole 1997). Here New Media professor Samuel Ebersole addresses the importance of John Walker, who initiated a lot of virtual reality research at AutoDesk. Specifically his quote "Reality isn't enough anymore" illustrates this very well. In contrast, according to Grau, the dawn of virtual reality has a more instrumental background, which can be seen in its large-scale employment by the military. Grau mentions a lot of these examples in his article "Intro the Belly of the Image- Historical Aspects of Virtual Reality", such as the panorama in England at the time of the Industrial Revolution, where it was implemented as reconnaissance and planning technology (Grau 1998, 366). Grau argues that we can only understand the phenomena of virtual reality if we view it on both a technological and a historical level. He argues that by doing this we can comprehend virtual reality's explosive impact as well as its connection to political power (Ibid. 1998, 365). Grau sees early examples of virtual reality in famous frescos of antiquity. According to him they can be seen as "A portal through which in one direction the gods pass into the real world and in the other real people enter into the image" (Ibid. 1998, 366). Here, Grau is implicitly referring to the immersive qualities of those frescos. While the many different histories of virtual reality might not agree on everything, the importance of immersion is shared by all of them.

Immersion is not only strongly linked to virtual reality, but also to video games in general. This is the main reason why today's gaming industry is so enthusiastic about virtual reality, personified predominantly by the Oculus Rift. While virtual reality gaming is clearly being hyped today, it is actually making a comeback. Virtual reality gaming is definitely not something new. It was hyped back in the eighties and nineties, but failed due to lacking technology (Boyer 2009).

A famous example of this can be seen in the Virtual Boy, a video game console manufactured by Nintendo. It was released in 1985 in Japan and North America, but failed miserably and was not released in other regions (Ibid. 2009). Gamers complained that its games were not realistic enough because they were not in full colour, and didn't allow head tracking capabilities. In addition, the hardware itself was tedious to use and non-portable. Instead, people had to interacted with the worlds of Virtual Boy games in the manner of any traditional two-dimensional game via a controller, while no other feedback from the body was incorporated into the gameplay. As a result, players were unable to immerse themselves properly (Ibid. 2009). Besides Virtual Boy, there were many examples of failed virtual reality gaming consoles during the eighties and nineties, which eventually caused virtual reality gaming's temporary demise.

Renaissance

So what caused this renaissance of virtual reality gaming? Firstly, this is due to developments in the mobile industry. Today, mobile screens are getting increasingly higher resolutions, which was one of the things missing with older virtual reality devices. The Oculus Rift consists of a screen that is also used in the tablet industry, along with an accelerator meter that is often implemented in smartphones. As a result prices can be kept lower, allowing more and more devices to be affordable for consumers (Van Maurik 2013). Secondly, the development of computer processing technology can now facilitate digital images with a realistic graphic quality, which is a necessity for immersive virtual reality experiences. And finally, the computer chips necessary for virtual reality gaming become smaller, faster, and less expensive every year. Think about Moore's Law in this instance,

which reveals that computing power doubles while prices reduce by half every eighteen months (Ebersole 1997).

We must be critical when evaluating the immersive qualities of today's virtual reality gaming technologies such as the Oculus Rift. We must be aware of the fact that people have already gotten accustomed to fast moving immersive images in our digital visual culture. This was not always the case. For example, many accounts have testified that viewers of the short film "Arrival of a Train" from the Lumiéré brothers (1896) jumped out of their seats out of fear the train would actually hit them. This example might surprise today's generation of digital natives, who are so accustomed to fast moving images that they consider such films boring and not in the least bit immersive.

Virtual Reality Gaming Pitfalls

Paul Bettner, the creator of the popular mobile application Words With Friends uses the following metaphor to describe the mergence of virtual reality and video game design: "It's like I am a painter and a new color is invented. If that did happen, every painter would be like, 'I've been spending so much time training myself to paint and there was this certain set of things that I understood; and now, all of a sudden, there's this thing that just fundamentally changes the craft.' That's exactly how this feels" (Ohannessian 2013). According to Bettner, virtual reality will clearly not be an easy transition for video game designers. To repeat Nate Mitchell's words: "Now we just need to totally reinvent gaming paradigms in order to use it" (Ohannessian 2013). This chapter will analyse what exactly needs to be reinvented. In other words: what are the major game design pitfalls of virtual

reality gaming?

A specific hardware related issue that arises has to do with lacking screen resolution. The Oculus Rift developer's kit has a screen resolution of 640×800 pixels per eye. According to Kreylos, the problem with this resolution has to do with the small black borders that are visible around each pixel, which results in a "screen-door effect" (Kreylos 2013). This effect can be quite annoying, and moreover, it can pull the player out of an immersive experience. Since a high level of graphical detail is very important for video games, this issue can pose a real problem for many gamers. Oculus VR has released a HD version with a screen resolution of 960x1080 pixels per eye. Players have reported that the HD version looks way better, but since the screen is literally in front of your face, the "screen-door effect" is hard to avoid completely. The following image illustrates the diminished "screen-door effect" with the HD version of the Oculus Rift:

Figure 1: Oculus Rift HD comparison

While the graphical quality is clearly increased, when you look real close, you can still see the borders of the pixels.

The next issue concerns head tracking. People must not have the illusion that today's head mounted displays such as the Oculus Rift offer 'true' head tracking capabilities, to the extend of actions such as looking around corners. Here a distinction must be made between head tracking and positional head tracking. The latter is mandatory in order to look around corners and is currently not integrated in the Oculus Rift. While gamers might argue that this is not necessary, because you can use your keyboard, mouse or controller to perform such actions, according to Kreylos they are missing an important element of human nature here. People move their heads subconsciously all the time. According to him the immersive illusion will break down if your virtual head, represented by the head mounted display, will not react the same way as it does in real world (Kreylos 2013). This poses a problem for virtual reality gaming, because these experiences are so convincing for the brain that this imbalance will lead to motion sickness (Ibid. 2013). Such experiences can be quite gruesome. Journalist Richard Eisenbeis describes his experience with the game Half Life 2: Episode 1 in the article "I Played the Oculus Rift for Five Hours Straight" (2013) as follows:

But the most painful thing I experienced came from the loading screens in Episode 1. If you don't remember, the screen in the game will freeze without warning for 10 seconds or so as the next area loads. And in a game where you are constantly adjusting your vision through head movement, suddenly having this control taken away is the most disorientating

experience I have had in my life. Just imagine how odd it would be if you turned your head in the real world but your vision remained the same as before. In practice, this feels like being stabbed in the brain at the same time as the world spins out from under you.

Motion sickness proves to be an issue on its own. It does not only occur due to the lack of positional head tracking. The most common cause is display lag, which happens when the screen does not move with the same speed as the person who is wearing the head mounted display (Kreylos 2012). This can be very discomforting and disorientating, as the experience of Eisenbeis illustrates, and is caused by our brain, which adopts head mounted display-based images as truths (Ibid. 2012). Display calibration is an additional reason for motion sickness. A head mounted display needs to replicate virtual object in the exact same way as they are projected onto the system's original screen and subsequently seen by its user. To do this, the graphics software will need to know the absolute positions and orientations of all screens, and the absolute positions of the user's eyes (Ibid. 2012). Since the screen of most head mounted displays, including the Oculus Rift, are very small and close to the viewer's eyes, there is almost no room for error. According to Kreylos the main problem here has to do with the fact that head mounted displays have to be mounted precisely in the same way every time they are used. If they are not worn in the exact same way, pre-configured projection parameters will not match reality (Ibid. 2012). In the case of the Oculus Rift this is inevitable. The Oculus Rift is worn like a ski mask with an elastic band, which makes it impossible to wear it in exactly the same way every time you use it. Calibration software will have a hard time ahead, ensuring the absolute physical comfort of future virtual reality gamers.

Then there is the issue of lens distortion. With typical head mounted displays, lenses are used to bring images into focus. However, these optics cause spatial and chromatic distortion into the image seen by the viewer. As a result, every image has to be pre-warped to get rid of this distortion. Research has shown that there are multiple methods to do this. You can warp images in a post-processing step, warp the scene geometry before rendering, or model corrective optics in the virtual camera (Pohl et al. 2013). The Oculus Rift does lens correction via the post-processing method. With this method, virtual worlds are first rendered into virtual camera images. These images are then resampled using an undistortion formula. According to Kreylos this approach poses a problem. Resampling an image into the same amount of pixels requires very sophisticated reconstruction filters. As a result, the Oculus Rift is sometimes troubled with distinct blurriness in the image (Kreylos 2013).

The Oculus Rift makes use of stereoscopic 3D, a technique to create 3D images. The harsh reality is that this can be done either really bad or really well. Bad stereoscopic 3D rendering can cause eyestrain and headaches, and this discomfort will cause users to feel less immersed (Kreylos 2012). There are multiple approaches to stereoscopic 3D. The most commonly used is called the 'toe-in stereo' approach. With this approach two normal cameras are both rotated slightly inwards, so that their viewing direction lines intersect exactly in the desired stereo-focus plane (Ibid. 2012). According to Kreylos, this approach is merely a rough approximation of 'true' stereo. This approach works intuitively, because our eyes also move inwards when we focus on nearby objects. However, 3D images are not projected directly onto our retinas. First they are projected onto a screen, after which they are viewed by us (Ibid. 2012). Kreylos argues that many of the reported physical
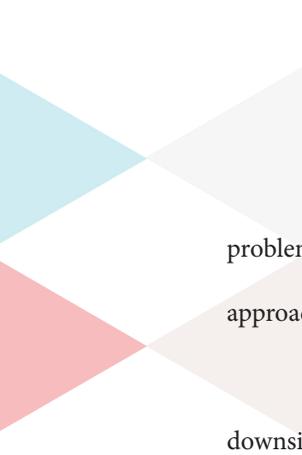
problems, such as eyestrain, can be explained by the wide implementation of the toe-in stereo approach (Ibid. 2012).

The Oculus Rift is currently only available as a developer's kit. According to Kreylos, the downside of the Oculus Rift developer's kit is its lack of interaction standards for virtual reality games. Currently each developer has to construct his or her own interaction and navigation methods. (Kreylos 2013). The danger with doing everything yourself is that you will get it wrong. But even if all game developers do it right, according to Kreylos there is another reason to have virtual reality middleware. Games are characterized by their specific user interfaces. Having a distinct interface that corresponds with the visual style of a particular game is a must for many video games to succeed (Kreylos 2012). But when you take away the skin of these interfaces they all work the same. Every gamer knows how to interact with a game because of interaction standards. Almost all first-person shooter use the 'WASD+mouse paradigm' to interact with the game. Take away these interaction standards and this will really confuse and piss off gamers. According to Kreylos, this problem is even worse with virtual reality gaming, because there are many more possible configurations to be made compared to ordinary video games (Ibid. 2012). Doing one of these configurations in the wrong way can result in one of the aforementioned physical discomforts.

B.J. Wooden, an indie game designer, addressed an issue concerning the design of virtual reality user interfaces. According to him, the positioning of information is a critical issue. The information must not be placed at the outskirts of the screen. It needs to be placed somewhere in the middle, where the player can clearly see it, but it must not get in the way of what the player has

to see of the virtual world (Ohannessian 2013). A study on virtual reality interfaces has shown that in contrast to 'conventional' interfaces, virtual reality interfaces contain more complex types of objects, behaviors, interactions and communications (Tanriverdi and Jacob 2001). The remediation of these interfaces into their virtual reality counterpart will therefore not pose to be an easy task for game designers.

In line with head tracking, the motion of other body parts can also be tracked and displayed in a virtual world. This is not done with a head mounted display, but with other standalone tracking devices. The Razer Hydra, a device that tracks the motion of your hands, is a commonly used motion tracking device, which has already been successfully implemented in several video game projects. In most first person shooter games, motion is compressed into one single action. This means that the direction the player is looking is also the direction the player is aiming his or her gun and the direction he or she is running (Iliff 2012). In real life, these three actions are not compressed but separate, and according to Kreylos this separation of movements is afforded by 3D tracking (Kreylos 2012). The problem, according to him, is that the action of aiming using a tracked input device such as the Razer Hydra does not work well in the canonical architecture of current first person shooter games (Ibid. 2012). According to him, many of these tracked input devices are good at picking up relative motions, but not at global positioning, which is mandatory for first person shooters, where players need to be able to aim as precise as possible. According to Kreylos, this is because magnetic 3D trackers, such as the Razer Hydra, have a tracking coordinate system that is non-linearly distorted. The Razer Hydra should therefore not be used as a 1:1 input device, but as an indirect device (Ibid. 2012). A lacking precise tracking
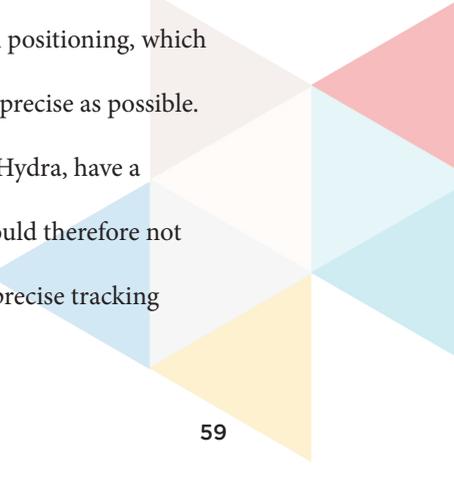
device that can be used for first person shooters might be a problem for fanatic first person shooter gamers. This is why I think these gamers will be better off with the reliable precision of the old-fashioned mouse and keyboard.

The final issue that will be addressed in this section concerns movement. Game producer James Iliff argues that the presence factor in virtual reality gaming drastically changes the sense of space. Subsequently, players will move more slowly and with more deliberation (Iliff 2012). This stands in sharp contrast with many of today's video games, which are characterized by their fast passed actions. In many of today's games players are capable of movements that would be highly unrealistic in real life. In an interview, game developer Denny Unger called these movements "superhuman", and explained that they will not work in virtual reality, because they can make players sick and will not let them connect very well to the gaming experience (Ohannessian 2013). According to Iliff, these unrealistic fast passed movements are necessary in today's video games in order to keep gamers engaged in virtual worlds where there is a lack of presence and intimacy with the gaming environment (Iliff 2012).

Avoiding the Pitfalls

Now that the pitfalls of virtual reality gaming are analysed on the level of mechanics, dynamics and aesthetics, what can we say about this information? The following chart illustrates the causal relation between the software and hardware pitfalls (mechanics), the run-time behaviours (dynamics), and the player's emotional responses (aesthetics). With the word 'canonical' I mean the way these mechanics are currently predominantly implemented in the industries.

Mechanics	Dynamics	Aesthetics
Lacking screen resolution	• Screen door effect. • Low graphical quality.	• Players will feel less immersed.
Lack of positional head tracking	• Brain will perceive imbalance.	• Players will feel less immersed. • Motion sickness.
Display lag	• Virtual world will keep turning during lag interval.	• Motion sickness. • Players will feel less immersed.
Display miscalibration	• Stereo images will be vertically displaced.	• Eyestrain. • Players will feel less immersed.
Lens distortion	• Distinct blurriness in the image.	• Players will feel less immersed.
Canonical stereoscopic 3d (Toe-in stereo)	• Brain refuses to merge stereo views. • Breakdown of 3D illusion.	• Eyestrain. • Headaches. • Players will feel less immersed.
Lack of interaction standards	• Broken interaction and navigation method. • Working, but 'never seen before' interaction and navigation method.	• Players will encounter navigation bugs. • Players will be confused. • Players will feel less immersed.
Canonical user interface	• Information placed on the outskirts of screen.	• Player will not be able to focus on the information.
Magnetic 3d trackers (Razer Hydra)	• Bad global positioning.	• Players will not be able to aim precise. • Players will feel less immersed.
Canonical player movement ('Superhuman' movement)	• Fast paced gameplay.	• Motion sickness. • Players will feel less immersed.

The problems always begin at the level of mechanics. Here it is either a lack of something hardware of software related, or a wrong set up of the hardware and/or software. Motion sickness and loss of immersion seem to be the two most common emotional responses the player gets as a result of issues at the level of mechanics and dynamics. Virtual reality video game designers could

subsequently revert these emotional responses by using this chart as a checklist. Avoiding these pitfalls will result in higher levels of immersion and less physical discomfort, which in turn are crucial factors for 'good' virtual reality gaming experiences.

Virtual Reality Gaming Solutions

Taking into account all the major game design pitfalls of virtual reality gaming can leave you with a somewhat pessimistic view towards the future of virtual reality gaming. However, there is some light at the end of the tunnel. Most of the hardware issues, such as a lacking screen resolution, have a good chance to be solved almost automatically due to developments in the smartphone and tablet industry (Van Maurik 2013). The Oculus Rift can only benefit from these developments in the coming years, as screens will have higher resolutions for a lower price, and computer chips will become smaller, faster and less expensive every year. The hardware related problem of a lack of positional head tracking could be solved using aftermarket techniques for 'do it yourself positional head tracking'. Oculus VR could for example implement LED sockets in the Oculus Rift's consumer version, allowing users to put their own LEDs and attach them themselves. These users could subsequently use motion tracking cameras such as the Xbox One Kinect or the Playstation 4 Eye, to track the position of their head. Finally, the problem of a lack of interaction standards can be solved if developers started working on a virtual reality gaming middleware, which is properly tested and makes use of working interaction metaphors. This does not mean every player will interact with a virtual reality video game in the same way. A common middleware will allow its users to pick their own favorite metaphors from a large database with preconfigured interaction standards, which they

can subsequently use across various games (Kreylos 2012).

Motion sickness, while mentioned a lot, is not an inevitable player response. As the chart from the previous chapter shows, this is always the result of a wrong software and/or hardware setup or a lack thereof (Kreylos 2012). But then what is the right way to do this? Valve's Michael Abrash seems to know the answer: "For VR to work well, you need display technology that gives you an image both your brain and eye are happy with" (Grayson 2012). While this might seem as a very difficult task, solutions are already at hand. Now, video game designers just have to implement them. In the case of 'bad' stereoscopic 3D, video game designers should stop simply applying the toe-in stereo approach, and use the 'skewed-frustrum' stereo approach. With this approach, instead of rotating the two cameras inwards, their lenses have to shift inwards (Kreylos 2012). While lens shift is a yet a technical difficulty for real life cameras, and is therefore not widely used yet in 3D cinema, in the 3D graphics world, cameras are virtual. This makes it much more easier to implement skewed-frustrum stereo. To counter motion sickness, video game designers will also need to know exactly where the viewer's eyes are positioned with respect to the screen (Kreylos 2012). And, as is mentioned before, the ski-mask design of the Oculus Rift does not afford this. Kreylos thinks that future head mounted display screens will contain a pair of stereo cameras that can precisely track the viewer's pupils, allowing the graphics software to set up the projection parameters in a correct way (Ibid. 2012). Only then will it not matter anymore how you wear a head mounted display. Until this technology is available, it will be important to come up with easy practical approaches to calibrate head mounted displays at the moment when they are used, and which can be taught to its users.
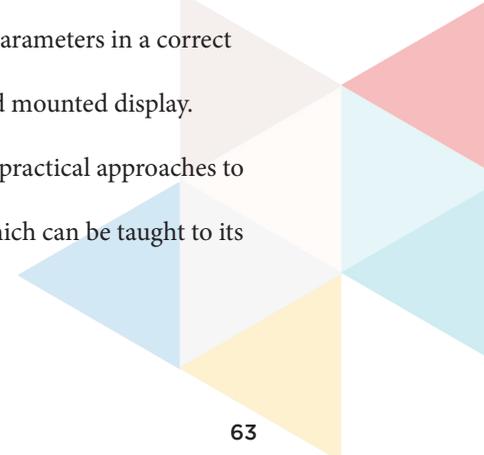
Conclusion (The future of VR)

Although virtual reality gaming is not in its infancy anymore, it is also not yet an adult. It has learned from past mistakes, and could fortunately profit from developments in technology related industries, but it is still not problem free. This paper has shown that there are many pitfalls concerning the game design of virtual reality games. While this paper has similarly shown that many of these pitfalls can be avoided, some technological problems remain. As this paper has shown, in cases such as positional head tracking and display calibration, we are still waiting for suitable technologies that can be implemented in consumer versions of head mounted displays such as the Oculus Rift. Therefore, I do not think high quality virtual reality gaming technology will be available as a commodity in the near future, because some technologies may remain inaccessible for quite some time. While the Oculus Rift will be available as a consumer version in the near future, for it to work properly, it will have to be tuned to every specific user, and this can discourage the average player who is not a technology expert and just wants to plug in and play.

What about the games themselves? Where will they come from and how will they look like? I think virtual reality games will initially come from the indie gaming community. Indie game developers can take more risks than major video game publishers because they have a low operating margin (Ohannessian 2013). How these games will look like is of course a more difficult question. However, we do know something. As we have learned, they will not be as fast paced as today's video games. Virtual reality games will have a more intimate character, where players interact more slowly and deliberate with the virtual objects. Therefore, I do not think that canonical first person shooter games will thrive as a virtual reality gaming genre. In addition, one could ask if such violent video games are even good for virtual reality to begin with. Indie game developer Denny Unger said in an interview: "Throwing someone into a first-person killing simulator is a sad statement of what the possibilities are with this new technology. It will become apparent that VR can actually give people enlightening experiences that you couldn't do on a monitor" (Ibid. 2013). Although violence might be a sad statement for virtual reality gaming, it has always managed to be successful in other entertainment industries, and we must not forget the consumer's role in this. If the demand for violent video games will remain as it is, it will be unlikely that they will fly out of the window. In turn, let us say violent video games will vanish, how will such "enlightening experiences" then look like? What kind of video games can actually 'enlighten' people? Possibly, such an example can be seen in Danny Unger's under development virtual reality game The Gallery, which is specifically being developed for the Oculus Rift. In this game you play as an urban explorer in a sewer network, where you suddenly come across a magical gallery full with beautiful paintings. In order to escape this gallery, you will have to physically enter these paintings and solve the mysteries within (Kickstarter 2013). In the Gallery, instead of moving with superhuman speeds, you will explore with an easy pace, and instead of shooting and fighting, you will be deliberately looking and walking. While this might sound boring to many of today's gamers, this is actually what will make virtual reality games special. Characteristic to virtual reality is the sense of presence and intimacy, which in turn facilitate immersion, and in order for that to work, virtual reality games must give players the time to absorb virtual environments carefully. The future of virtual reality gaming should not be seen through the lens of current generation's games. This would result in a kind of 'horseless carriage syndrome' (McLuhan 1964). Similarly,

game developers should not design virtual reality games with current canonical video games in their minds. Instead, they should look at the affordances virtual reality technology gives us, and base their games on that. Only then, will game developers be able to unlock virtual reality gaming's true potential.

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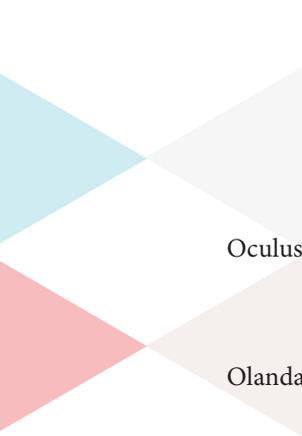
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YOU PASSED LEVEL 2
GO TO THE NEXT LEVEL
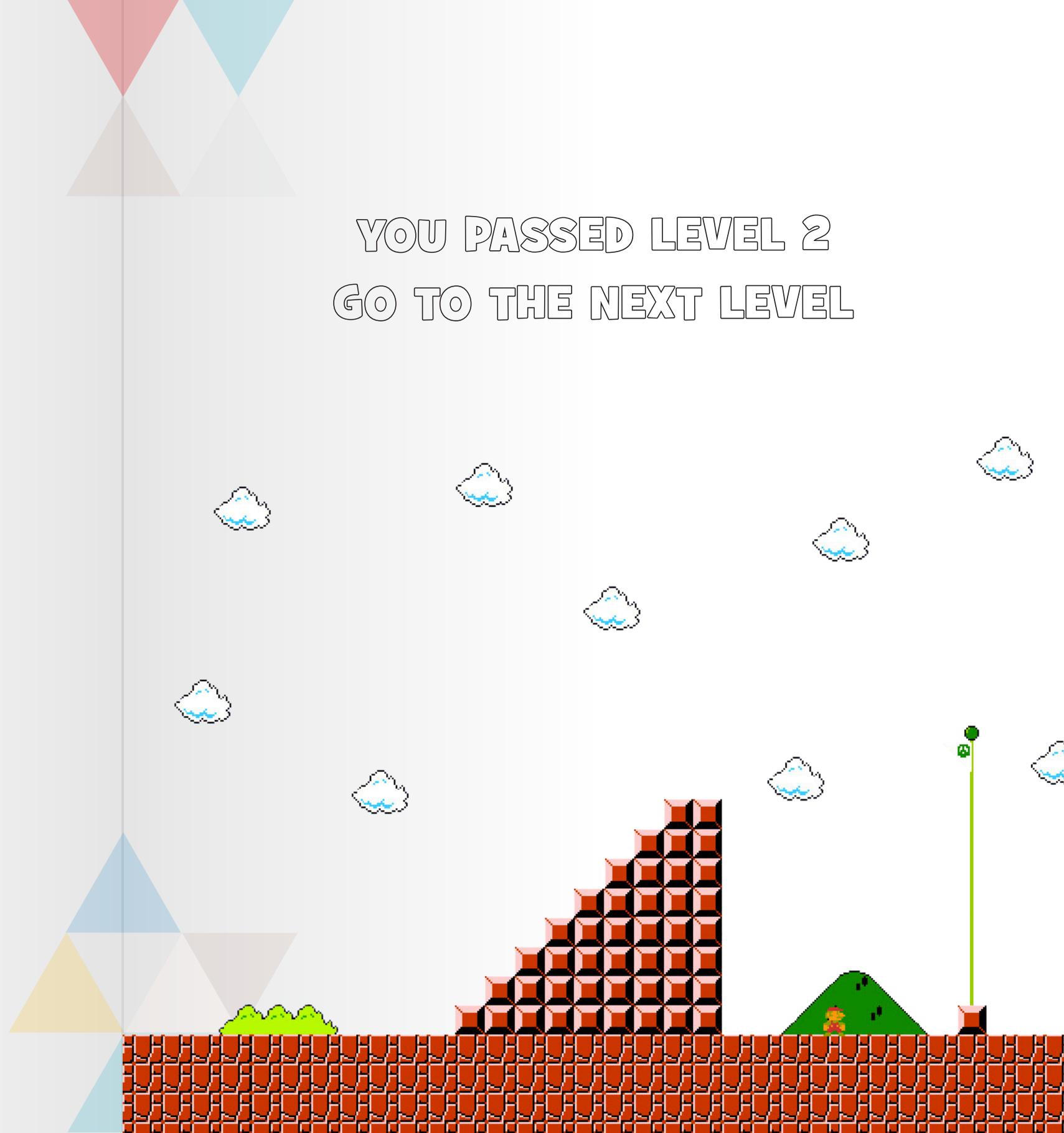
LEVEL 3

ANTJE ZISKA

LIVING ANOTHER LIFE?
IDENTITY FORMATION IN THE SIMS AND ITS EFFECTS ON THE PLAYER'S NON-VIRTUAL LIFE AND PERSONALITY

ABSTRACT - As *The Sims* is a very popular computer game it is not surprising that there has been a lot of research and studies on it. Still, most of the research focuses on aspects concerning gender construction, women and gaming and the domestic space. This paper will add to this existing discourse by researching the formation of ludic identity within the game and trying to point out to what extent and in which way this may affect the player's identity and perception of the real life.

After introducing the current state of research concerning *The Sims*, the theory of the ludic identity by Jos de Mul will be explained with the help of his article *The Game of Life: Narrative and Ludic Identity Formation in Computer Games* (2005). In this context it will be pointed out why an approach using de Mul's theory of the ludic identity can be seen as an intervention that adds to the already existing discourse. Finally, identity formation in *The Sims* will be studied making a textual analysis of *The Sims 3* focusing on aspects such as the creation of a virtual life and identity construction.

It turns out that the game is, due to its complexity and variety, so convincing that the player, to some extent, wants this virtual life to be true even though he knows that this is not possible.
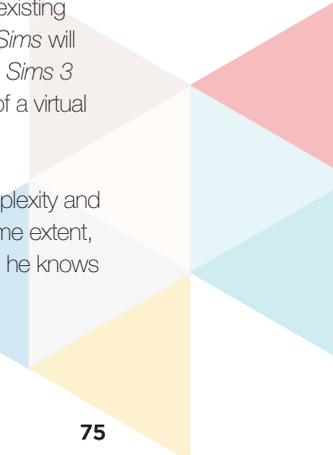
Introduction

Jane Smith is a successful director and mother of two grown-up children. She owns a house, a car and a lot of money. Recently, she has been to Egypt, discovering the pyramids. She is satisfied with her life even though she did not manage to find her true love yet (former relationships always led to a rather dramatic breakup). Her future plans? Learning how to cook a lobster. Jane has quite a perfect life, except for the fact that it is not real. Jane is a virtual human – a so-called "Sim".

The Sims, a computer game by Electronic Arts, offers the possibility of playing with the life of self created virtual humans. Even though it is not as true-to-life as for example *Second Life* it still contains many features which can also be found in the 'real life' of a person. When playing The Sims, the player enters a virtual world with rules, possibilities and limits. In contrast to many other strategic life simulation games, such as *Spore*, The Sims simulates the more or less everyday life of humans. Hence, the player gets the possibility to slip into a role and act out a life which he usually does not have.

As The Sims is a very popular computer game, it is not surprising that there has been a lot of research and studies on it. Most of the research focuses on aspects concerning gender construction, women and gaming and the domestic space, but within the field of Game Studies there has been no research on the topic of the ludic identity construction so far. As human identity is not a self contained but an actively constructed identity, it is influenced by different expressions of the social world. Computer games are one kind of these expressions, that mediate between us and either our world, our fellow man or ourselves (De Mul 2005, 251). In his theory on ludic identity, Jos de Mul points out that the player identifies with the space of possibilities within a

Figure 1: Sim-house (outside) - http://thumbs.modthesims2.com/img/4/8/8/8/4/3/MTS_Autiep03-929711-ss2.jpg

Figure 2: Sim-house (inside) - http://thumbs.modthesims2.com/img/4/8/8/8/4/3/MTS_Autiep03-929715-ss6.jpg

game. According to de Mul, the possible action and the choices made are applied to the player's self, which affects the player's identity. In this context, it is interesting to examine to what extent the virtual[1] life in The Sims influences the player's perception of his real life. Could it be that he cannot clearly distinguish between the two lives anymore? Does he maybe even want this virtual life to be true? What consequences could this have for the player's identity in real life?

This paper will add to the existing discourse by researching identity formation within the game The Sims. It will try to point out how this may affect the players' identity and perception of their real life, which leads to the following research questions: To what extent and under which circumstances might the player see strong resemblances between life in the game The Sims and his real life? How are the player's identity and perception of his real life influenced by this? To answer this question, the paper will at first introduce the state of research concerning The Sims, mentioning the topics that have been studied so far and pointing out the absence of the identity aspect. In the next paragraph, the theory of ludic identity by Jos de Mul will be explained with the help of his article *The Game of Life: Narrative and Ludic Identity Formation in Computer Games* (2005). Additionally, relevant aspects of identity formation in The Sims will be indicated. This will be followed by a short explanation of why an approach using de Mul's theory of the ludic identity can be seen as an intervention that adds to the already existing state of research. In the third paragraph, identity formation in The Sims will be studied through a textual analysis of *The Sims 3* focusing on aspects such as the creation of a virtual life and identity construction in the game. In the conclusion, important results from the examination will be presented, the research question will be answered and possible topics for future papers will be pointed out.

State of Research Concerning The Sims

As already mentioned in the introduction there has been substantial research on The Sims since the game was released in 2000 by Will Wright. Mostly, the research was done from a feministic point of view, focusing on the aspects of gender and the domestic space within the game (Beavis et al. 2005; Flanagan 2003; Kafai et al. 2008; Lauwaert 2009; Sicart 2003; Sihvonen 2011; Wirman 2011). In this context, Catherine Beavis and Claire Charles deal with "the gendered dimensions of teenagers' engagement with digital culture" (Beavis et al. 2005, 356) which they also examine in terms of The Sims. Apart from Mary Flanagan, Tanja Sihvonen and Maaike Lauwaert, who develop some theories on the domestic space concerning the game (Flanagan 2003; Sihvonen 2011; Lauwaert 2009), Miguel Sicart deals with The Sims in terms of gender as well. During the first 'International Digital Games Research Conference', which took place in the Netherlands in 2003, he presented his research regarding family values and ideology issues (Sicart 2003).

James Paul Gee and Elisabeth R. Hayes have studied the gender topic by approaching it from a pedagogic perspective. In their book *Women and Gaming: The Sims and 21st Century Learning* (Gee et al. 2010) they focus on the aspect of learning within the game. In this context, Jim Ranalli's research study on learning English when playing The Sims should be mentioned as well as he also acts from a pedagogic point of view (Ranalli 2008).

Furthermore, there have been studies on the possibilities of storytelling with the help of The Sims. There is "a photo album feature in the game: Players are able to take screenshots from the game and write descriptions for the pictures and even share these albums in the web" (Heliö 2005, 4). Besides, this camera tool in *The Sims 2* and The Sims 3 allows the player to shoot his own films

which has been analyzed by Diana Ford (2007) and Caitlin Kelleher (2008).

But even though many researchers deal with The Sims in their studies, no one has focused on the aspect of the ludic identity so far. Hanna E. Wirman wrote a book about the 'skinning' within The Sims. She explains that many players use the provided tools for creating their own fashion and accessories, hence skins, for their Sims which leads, according to Wirman, to an identification process (Wirman 2011). Still, her research is just a starting point regarding ludic identity as she only focuses on the identification with the skin of a Sim. She does not examine the process of identification with the Sim as a whole or with the process of actually playing the game. Moreover, the title of her book *Playing The Sims 2: Constructing and negotiating woman computer game player identities through the practice of skinning* (2011) already indicates that Wirman mainly focuses on the identification of female players.

This paper will try to add to the existing discourse by having a closer look on the formation of the ludic identity in The Sims which has not been carefully studied yet, not even in Wirman's research. In this context, there will be no focus on just one gender but male and female players will equally be taken into account.

The Ludic Identity

Theory of the Ludic Identity

In the introduction, it was mentioned that human identity is not a self-contained, but an actively constructed identity, which is influenced by different expressions (De Mul 2005, 251). The identity

Figure 3: Some facial expressions of male Sims
http://thumbs.modthesims2.com/img/1/7/4/3/3/2/MTS_tamo-1126259-tamo_Faces_UltraPlain_AllAges_M.jpg

Figure 4: Some facial expressions of female Sims
http://thumbs.modthesims2.com/img/1/7/4/3/3/2/MTS_tamo-1126258-tamo_Faces_UltraPlain_AllAges_F.jpg

of a person is not static but to continually changing at any time. Hence, it presents itself in a different way in every communicative situation. The expressions by which identity is influenced are also continuously changing under the historical and present conditions. Therefore, the formation of human identity is a never-ending process (Kuhn 2009, 173 ff.).

In his article *The Game of Life: Narrative and Ludic Identity Formation in Computer Games* (2005), Jos de Mul introduces the theory of the ludic identity. This theory is an adaptation of Ricoeur's theory of the narrative identity. For this reason, Ricoeur's concept is introduced before the actual theory of the ludic identity will be explained. Ricoeur distinguishes between the *même* and the *soi-même*. Whereas a stone is characterized by its sheer permanence in time, the identity of humans includes personal involvement and reflective consciousness of their existence. Hence, human identity is not only a fact (*same*-identity), but a continuous task (*self*-identity). Besides, it is based on narration. As humans tell others and themselves stories about their lives, they are continuously involved in a variety of stories. Through the identification with those stories the human identity is constructed. According to Ricoeur, narrative is therefore a medium that gives the human identity its form. In this regard, again, it turns out that identity is not pregiven or static but formed and influenced by the actions of humans and their narrative reflection on them (De Mul 2005, 252 ff.).

Ricoeur's theory is based on three different phases: $mimesis_1$, $mimesis_2$ and $mimesis_3$. The first phase, $mimesis_1$, describes the narrative prefiguration. Ricoeur claims that our actions are guided by a certain knowledge, such as personal interests and values. Hence, all our actions already contain a story. The life of humans is, then, a quest always looking for a narrative. The next step,

$mimesis_2$, refers to the expression in explicit narratives. A plot is developed that unites the several elements of a story and hence causes concordance. This concordance is influenced by discordances which leads to Ricoeur's conclusion that the developed plot is not a static story but a dynamic whole with discordant concordances. Finally, in $mimesis_3$, the narrative identity is constructed as humans identify with the characters of the story. Due to the character's instability the identity of the identifying person is influenced and changed (Ibid., 254).

Computer games are, just as narratives, one type of expression that mediates between us and either our world, our fellow man or ourselves, and influences the formation of identity (Ibid., 251 & 260). Adapting Ricoeur's theory, de Mul introduces three different phases which he calls $play_1$, $play_2$ and $play_3$. The first phase, $play_1$, refers to the ludic prefiguration, i.e. humans experience the world as playful in their daily lives. In the next phase, $play_2$, this playfulness of the world is expressed in a game following a set of rules and offering a space for several possible actions. The final step, $play_3$, contains the construction of the ludic identity. The player identifies with the space of possibilities provided by a game. The possible action is applied to the self as there is not a simple imitation of the rules of the game but an appropriate behavior on behalf of the player. Related to this assimilated behavior, the player's identity is influenced and changed. Concordances and discordances can, just as in case of the narrative identity, also be found in the context of the ludic identity formation (Ibid., 260). After the concept of ludic identity construction has been pointed out, the next paragraph will explain why this theory can be seen as an intervention when studying The Sims.

Ludic Identity as an Intervention

It has been explained that ludic identity is basically constructed when the player is playing a game. His identification with the characters and the setting of the game results in the formation of a ludic identity, which has an impact on the player and, therefore, this also has consequences for his identity in real life. The relation between the game and the player "is unique and fundamentally different from other entertainment media. It enables players to develop their identities in interaction with game content" (Jansz n.d., 153). This is especially interesting in terms of The Sims. Nutt et al. define the genre of The Sims as "real life" (Nutt et al. 2003, 577). The player gets the possibility of acting out real life scenarios that he might have dreamed of but could never create in reality. As The Sims is based on aspects of real life, the player has a special connection with the game. It is not only the formation of a ludic identity that takes place within the game but also the real life scenario that influence the player and his identity. For this reason it seems to be an interesting approach to study The Sims from a ludic identity perspective. It is not just the absence of this aspect in the current research but also the just mentioned special relationship between the player and the game that make such an approach very interesting. Having explained the general background, the game The Sims 3 will serve as an example for the analysis in the next chapter.

Textual Analysis: Identity Formation in The Sims 3

The following research will be based on a textual analysis of The Sims 3[2] , an updated version of the core game The Sims which was released in 2009. Here, the word "textual" does not only refer to written texts but is used to

> describe more than a printed document, textbook or a written cell phone message. In textual analysis we see texts as cultural artifacts, material documentary evidence that is used to make sense out of our lives
>
> (Brennen 2012,193).

In qualitative research, relations between society, culture and media are examined by studying and interpreting these artifacts carefully. In this context, "the entire range of potential meanings in texts" (Ibid., 194) will be examined. At first, the game itself will be described, to point out its content, structure and purpose. Afterwards, certain aspects which are import in the context of the ludic identity construction will be described in more detail to examine them with regard to the research question.

When playing The Sims 3, the player starts with the creation of one or more virtual humans, the so-called "Sims". The game offers various possibilities, e.g. different skin and hair colors, detailed facial modifications, a lot of outfits and accessories, so that the player can create a quite individual Sim, materializing his own ideas and preferences. Apart from the outer appearance the player chooses character traits, ambitions, likes and dislikes as well as a lifetime wish. These characteristics will later on influence the behavior of the Sim. After this, the game basically consists of three different levels: Build, Buy and Live. At first, the player builds a house for his Sims, which is followed by buying objects to furnish it.[3] Finally, he starts playing with and controlling the lives of his new created virtual humans.

It is a game where the player controls the actions and behaviour of individual characters […] within a community. Sims live alone or in family groups, in homes that must be furnished and made comfortable. They may go out to work, or stay at home. They must interact with others, make friends, form close interpersonal relationships. They may marry, or move in together, have babies, or care for children. If their basic needs are not met, they will die, or at least fail to thrive

(Nutt et al. 2003, 577).

The game is "like a combination of a simulation game and an old-fashioned dollhouse" (Wirman 2011, 32 ff.). The Live-Modus of the game offers a complex menu that shows all the important information about a Sim, such as needs, interests and preferences, age, personality, career and relationships. "These scales and meters contribute to the complexity of the game as its gameplay is largely about optimising the well-being of an individual character and a family" (Ibid., 32). Each Sims has his own free will, which makes him to some extent independent from the player. However, when acting on free will the Sims mainly cover their needs but perform and achieve much less than when controlled by the player. Even though the game is open-ended, there are no some rules, or better, limits in The Sims. If the Sims are, for example, in a very bad mood, and if their needs are not fulfilled by the player, they are often not willing to perform tasks as learning[4] and working any more. Besides, there is "a negative goal, a goal that the player is supposed not to reach. This is to die and, consequently, to stop playing" (Wirman 2011, 136). Still, the player is not forced by the game

to take challenges. Apart from fulfilling the basic needs of the Sims, the game mostly depends on the individual goals of the player, e.g. acting out stories he has in mind, building dream houses, buying expensive objects etc.

The player's perspective is often described as "God like and omniscient, […] [as] the player is able to control and view several characters simultaneously" (Ibid., 32). Compared to older versions, in The Sims 3 the player can even influence the Sims when they are at work. Thus, he has the possibility of controlling them the whole time, which makes him very powerful. "The player's perspective, the 'God mode', grants […] [the] chance to operate the lives and daily actions of simulated humans by adopting an upper angle view on the events on the screen" (Sihvonen 2011, 129). As part of having all this power, the player is invited to explore all the possibilities and limits of the game. In this context, for many people it seems to be interesting to find out what happens when the Sims' needs are not fulfilled. "Gamers are not always good Gods. It's such a temptation to set up a Sim to suffer. Deprive them of a knowledge of cooking and pretty soon they set fire to themselves. Build a house without doors or windows and they starve" (Wark 2006, 131).

The grade of quality concerning animation and graphic of The Sims 3 is quite astonishing. Not only that the Sims live and act in a three-dimensional world, they also look very human, especially in comparison to the figures of the core game The Sims. In The Sims 3 the Sims move just as natural humans, including a complex pool of gestures and facial expressions (see Fig. 3 and 4). As they have individual characters followed by individual needs, dreams, fears and wishes, and they have a very complex personality which makes them even more human.

Nevertheless, the game also contains some unnatural elements. Apart from earlier

mentioned fictional characters, such as vampires, witches, werewolves, unicorns and mermaids the Sims can also meet the Grim Reaper. When a Sim dies[5] the Grim Reaper appears to take him. The other Sims can bargain the Grim Reaper for reviving the Sim. Often the Grim Reaper offers them to play rock-paper-scissors, which is of course a fictional scenario. If the Sim wins, the dead Sim will be revived, if the Grim Reaper wins, he will take the Sim's life leaving behind a grave stone (from which at night the Sim's ghost may arise)[6]. Apart from the topic of death, which seems to be quite a central issue in the game, the manipulation of time is also interesting in terms of unnaturalness. First of all, the player can use the pause modus to interrupt the game. This is especially interesting regarding the loss of control. Whenever the player cannot handle a situation, as maybe several Sims need to be commanded at once, he can pause the game to regain power and control. Besides this, he can accelerate the speed. For example, this is useful when the Sims are sleeping, hence, the player does not have to command anything but must wait until they wake up. In addition to this direct time control, again, death is an important issue. It is possible to create a rejuvenation potion which delays death. Other unnatural elements are trees from which money can be harvested, the self-cleaning upgrade of several objects, including bathtubs, stoves and kitchen counters, and certain careers, such as ghost hunters and magicians.

Although The Sims 3 contains all these unnatural elements it can still be claimed that it is very true-to-life especially regarding all the previously mentioned expansion packs. The game allows "to construct and control characters […], to dress and house them, nurture them and care for them, and construct very complex narratives around them" (Nutt et al. 2003, 582 ff.). This construction of stories is especially important regarding the formation of identity. The players

get "the chance to play creatively with 'like real life' narratives in complex and creative ways. They can play God and create utopian communities, or rewrite aspects of their own lives to negotiate different imagined outcomes" (Ibid., 589 ff.).

When playing The Sims 3 the player enters another world, the so-called "magic circle". Referring to Johann Huizinga, who introduced this term, Katie Salen and Eric Zimmerman describe the magic circle as the place, where a game takes place (Salen et al. 2004, 95). "To play a game means entering a magic circle […]. Within the magic circle, special meanings accrue and cluster around objects and behaviors. In effect, a new reality is created, defined by the rules of the game and inhabited by its players" (Ibid., 95 ff.). Entering this other (in case of The Sims 3), virtual world is very important for the construction of ludic identity, as the player perceives the real world outside the game in another way.

Within the game the player gets the possibility of acting out stories he has in mind as well as making his dreams come true. He can in fact create a Sim that looks like himself, build him a house that he has always dreamt of and chose a career that he always wanted to have but could not reach in his real life.[7] He can make a lot of friends, get married, have children or become a VIP, as well as travel around the world and perfect his skills. Acting out all these stories is still restricted by some rules, as two Sims can only marry when they are in love (which means that the player has to make sure that they get to know each other), they are only promoted and improve their skills when they are in a good mood (which means that the player has to fulfill their needs) and a dream house can only be built when the Sims own enough money (which means that the player has to make them work hard for a career).[8]

Taking all the possibilities and scenarios into account that are offered by The Sims 3, the player can indeed act out almost all stories he may think of. Even though there are some restrictions in terms of achieving certain goals, the player's ideas are not significantly restricted. One could argue that hereby the game gets more challenging as it takes some effort to make all the player's dreams come true. Besides this, the player can easily identify with the virtual humans he creates as they have strong resemblances with real humans, not only in terms of their appearance and gestures but also regarding all the actions they can perform. The God-perspective does not prohibit such an identification. It is rather the means of playing the game, the way the player commands the Sims and acts out his individual stories within the game, but it does not prevent him from identifying with the Sims. On the contrary, due to the God-perspective the player can watch the Sims everywhere and at all times. Observing the Sims and their actions is when the player will get lost in their world and identifies with them as, whatever it is they may do, everything seems to be very realistic and natural. Additionally, the game contains an uncountable amount of carefully and lovingly crafted details so that the game gets very complex and even more realistic. This endless world of opportunities and choices is just like a virtual wonderland in which the player can plunge, get lost, experiment, explore, decide, command, control, succeed and fail. Having examined several aspects of The Sims 3, in the final paragraph it will be pointed out to what extent and how the player's identity and perception of his real life are influenced by playing and identifying with the game and its characters..

Conclusion

It has been shown that The Sims 3 contains a very intricate and detailed structure that makes it possible for the player to create a very complex world for his very own Sims.
He gets, especially when turning off the free will, the opportunity to control everything in this virtual world. Concerning the theory of ludic identity one can remark that the player perceives his real life in a playful way and gets through, the game The Sims 3, the possibility of acting out his playful ideas – which may often be ideas that he cannot make come true is his real life. Hence, when playing the game he identifies with the Sims he created (who, thanks to a variety of tools, can be created according to his individual preferences). For this reason, the created Sims are not just virtual characters but have strong resemblances with real humans, e.g. a complex personality. This, alongside other elements of the game, such as the convincing three-dimensional graphic, strengthens the formation of a ludic identity.
Getting back to the research question, it can be argued that the player's perception of his real life is affected by the game. Even though he might not assume that this virtual world is in fact the real world he lives in, he will probably compare the two worlds, reflecting on the associated possibilities and limits. It was shown that within the game there is not only uncountable ways of acting out true-to-life stories but also some supernatural elements. Thus, actually the game goes much more further than the real world. When certain aspects in real life do not work out the player may wish that his life was, just for a moment, as in The Sims 3. Not only everyone is equal and has the same opportunities, which is definitely not the case in real life, the player can also control time and death. Accelerating the speed or pausing time are as well as reviving beloved people aspects that humans
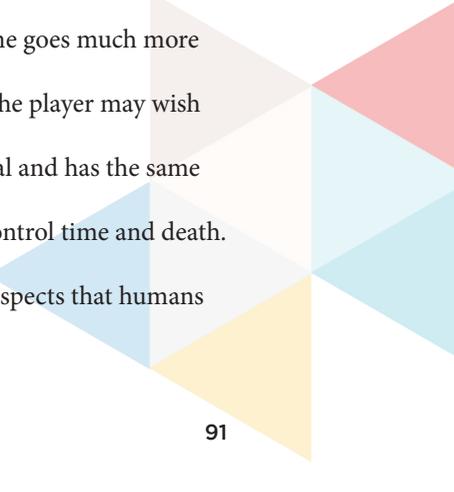
might want to have in their real lives, too. Therefore, the player will miss certain possibilities in his

real life that are provided by The Sims 3.

Further research could focus on interviews to examine the ideas provided in that paper from a

more personal view of different players. This could either support the paper's arguments or correct

them if something turns out not to be true. Besides this, The Sims 3 was also released as a Mobile

Game. In this context, it would be interesting to find out how the mobile aspect of the game, and

the possibility of playing it anywhere at any time, influences the player's identity formation.

All in all, the player is in fact not "living another life" when playing The Sims 3 but, as there are

strong resemblances between the virtual Sim-life and his own life, his identity and perception of

his real life are definitely influenced. Within the game it is much easier for him to make his dreams

come true. Thus, the player can re-enact his real life within the game and, beyond that, pass certain

limits of real life so that everything seems to be possible in the virtual world. This might make him

wish for this virtual life to be true even though this will never happen, Jane, the successful director

and mother of two grown-up children, will always remain virtual.

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Notes

[1] Even though the term "virtual" is used in this context it should be kept in mind that it can still have consequences for real life. "Virtual" should hence not be mistaken as "non-existing".

[2] The game The Sims was introduced in 2000 but has been developed much further since then. Not only that newer versions of The Sims were published, namely The Sims 2 and The Sims 3, but there is also a remarkable number of extension packs which enlarges the possibilities the player has within the game. Whereas the core version of The Sims offers a rather limited neighborhood the player can even travel to China, France and Egypt in The Sims 3 when he buys the expansion pack "World Adventures". Further expansion packs for The Sims 3 are: "Ambitions", "Late Night", "Generations", "Pets", "Into the Future", "Supernatural", "University Life", "Island Paradise" and "Showtime". Most of them make the game more realistic, but some add rather unnatural elements as vampires, aliens, unicorns, witchcraft and time-travelling. Additionally, there is also a list of expansions packs that provide unique objects and furniture according to different themes, such as "Movie Stuff", "70s, 80s & 90s Stuff" and "Outdoor Living Stuff". The release of "The Sims 4" has already been announced for 2014.

[3] As the game was originally intended for architectural purposes, the player has an almost never ending pool of objects,

colors and tools to build his very own dream house (see Fig. 1 and 2).

Several videos show the construction of very complex houses using the tools of The Sims 3,

e.g. https://www.youtube.com/watch?v=SBmkBa1eep8 (last accessed: 07-11-2013).

[4] A basic element of the game is the need of learning and improving skills, such as Cooking, Playing several instruments,

Painting, Fishing, Charisma, Writing, Gardening, Handiness and Athletic Skills. The more a Sim learns of these skills the

better he gets and the more he can profit from it, e.g. earning more money when playing the guitar on a high level. Besides,

each career requires certain skills. Without learning them, the Sim will not reach a high career level.

[5] As already pointed out the Sims often die an unnatural death due to the player's eagerness to experiment. It should also be

mentioned at this point that The Sims 3 provides a large amount of ways to kill a Sim. Apart from old age, starvation, electric

shocks, drowning and burning Sims can also be hit by a meteor or be cursed by a mummy etc. – all leading to death.

[6] It should be taken into account that not all ghosts are the same. Depending on the cause of death the ghosts have different

colors. Finding out which cause of death leads to which color might be another reason for the player's experiments with

killing a Sim.

[7] For example, in real life people have to fulfill certain physical conditions if they want to become a police officer or fireman.

Within The Sims 3 basically every Sim can do everything provided by the game not matter what gender, skin color, IQ or

physical condition the Sim has. All Sims are equal.

[8] There is, as in many games, various cheats for The Sims 3 including cheats for getting money without having to work at all.

Hence, the player can decide if he follows the rules and makes his Sims earn the money or whether he uses a cheat. Both

ways can contribute to the player's fantasies and stories, it depends on the player's preferences which way he chooses.

YOU PASSED LEVEL 3
GO TO THE NEXT LEVEL

ANTJE ZISKA   **LIVING ANOTHER LIFE?**
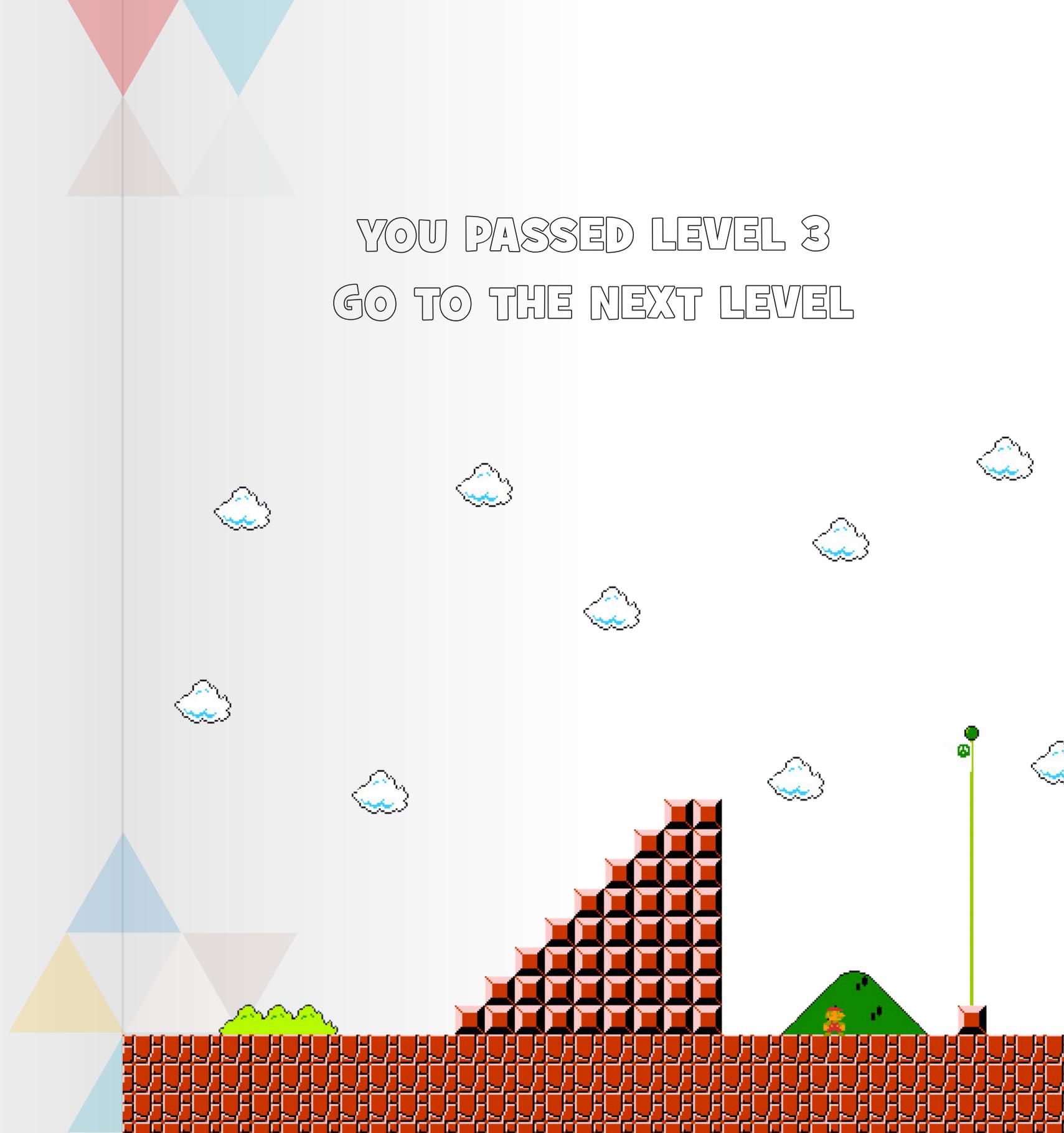
LEVEL 4

MARA VANDOROU

IS DIGITAL GAME BASED LEARNING THE EDUCATIONAL UTOPIA OF THE FUTURE? CONSTRUCTING YOUTH'S PROFESSIONAL IDENTITIES WITH EPISTEMIC GAMES.

ABSTRACT - Although digital games dominate youngster's lives, there are many who demonize this habit as being distracting, destructive and addictive. However, in the past years, this taboo is starting to fade. The academic research on the positive effects of digital gaming is growing and has established digital games as a very effective educational tool. The implementation of digital games in education may sounded far-fetched a few years ago, however many academics and researchers are developing games for strictly educational purposes. David Williamson Shaffer, a professor in the University of Wisconsin-Madison, is one of the pioneers in creating educational digital games. More specifically, Shaffer and his research team are working on a set of professional simulations, the epistemic games. This paper will investigate the positive effects of epistemic games in helping youth construct their professional identities and develop the necessary confidence and skills before entering the "adult world".
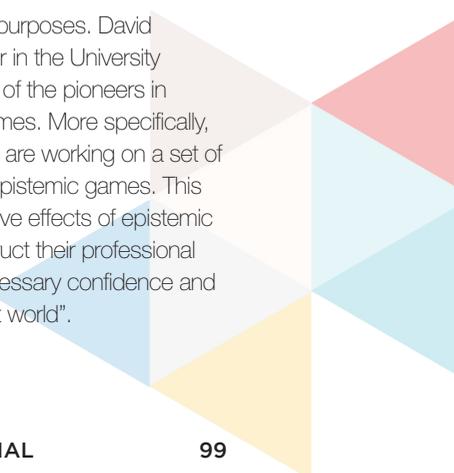
Introduction: Digital natives

Digital media penetrate life in all possible depths and ranges becoming a crucial factor of the human identity formation. Of all the digital media branches, computer games is among those who dominate the market economically, and therefore culturally. Statistically, computer games is a 20 billion dollar industry, supported by millions of adolescents who are willing to invest their leisure time and many of their savings to this ludic habit. But it's not just the video games.

Youth identity is deeply woven by information society with digital games, social networks, internet and sophisticated smartphones dominating youngster's lives. The generation of digital natives is growing and has already developed its very own rules, practices and codes of communication. The problem rises with the realization that modern educational institutions may have turned into a Babel tower for the majority of adolescents as the 'digital natives' seem to be rather incompatible with the traditional methodologies of a rather obsolete educational system. Could an educational system be possibly efficient and fulfilling when it remains immune to all the changes that digital media brought? The question, although broad, tries to underline the challenge educational institutions have to face in order to reevaluate the way in which education is being delivered.

In the current essay, I will try to examine how video games could be an essential element for the drastic optimization of the modern educational system. However, discussing a radical change in the educational curriculum as a whole would be a rather bold move with various implications, so I will try to isolate my field of interest. One of the most – if not *the* most - fundamental aspects of school is that it functions like a channel between the adolescent and the real world. A school can only reach its higher goal if it can prepare and 'equip' the students with all the necessary skills, values and knowledge that will help him construct a solid personal identity, a sense of self in accordance to the future life that awaits him.

Shaffer's epistemic frame hypothesis suggests that every group of expertise has a specific structure that consists of skills, knowledge, values, identity and epistemology. The foresaid elements compose the epistemic frame of a professional community. Epistemic games (Shaffer 2005) are games that simulate the learning practices, or practicum, of a specific profession.

In the current paper, I will examine how video games could be used as the light-houses for the adolescent's career orientation in schools, by answering a basic research question: How can epistemic games be an efficient tool for the construction of students' future professional identities? In order to answer my research question I will integrate ludic identify theory within Michael Shaffer's epistemic games frame in order to examine how efficiently the epistemic games could construct adolescent's professional identities.

Epistemic games

Epistemic Games are the brain child of David Williamson Shaffer who is professor and leader of Epistemic Games Research Group of University of Wisconsin. Michael Shaffer's epistemic game hypothesis will be the specific game template I am going to study. Shaffer developed the epistemic frame theory which proposes that solving complex problem derives from being part of a community of practice. Developing the epistemic frame of a professional community is the process of attaining the skills, knowledge, values, identity and epistemology of a specific field,

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like engineering, journalism or land use planning (Shaffer 2012). Along with the Research Group of Wisconsin, Shaffer is the pioneer developer of epistemic games. Shaffer and his team have developed seven epistemic games in total. In the current paper I will focus on *urban science*, as my research case study.

In 2005, Jos de Mul developed the theory of ludic identity in order to sketch how selfhood is associated with games. More specifically Mul's theory is a tribute for how games can become a fundamental tool for the construction of the player's identity and subsequently an important layer of the individual's identity as a whole. The ludic identity theory provides an essential understanding on how the action of gaming is directly applied to the player's identity. Ludic identity theory is the theoretical lens I am going to use in order to examine why and how urban science - and therefore epistemic games - can be an effective tool for constructing youth's professional identities and therefore a positive addition in the schools' curricula.

Games as texts

Before analyzing urban science through ludic identity theory, I will make a textual analysis of the specific epistemic game. According to Bonnie Brennen, "texts are things that we use to make meaning from"(Brennen 2013, 193).The penetration of digital games in pop culture establishes them as dominant cultural texts. However, despite the high visibility of the games studies field, suitable methodologies for studying games are still in the developmental stage (Lammes 2007, 25). "Reading" a game as text requires the creation of a solid methodology. A qualitative approach of games has risen the interest of the academic community. Espen Aarseth proposed that three

effective ways for acquiring knowledge about the messages of a game include study of its design, rules and mechanisms by observation of players or active playing from the researcher's part (Aarseth 2003, 3).Based on Aarseth's template, I will make a textual analysis of Urban Science epistemic game in order to deconstruct its separate elements and critically analyze its basic design, mechanisms and rules. The collection of data derives from online urban science demonstration videos and player's reviews as well as Shaffer's writings concerning the game's functions.

Serious games for a fun education

Digital technology undoubtedly gave a massive dimension to the game element. The term "ludic technologies" describes the various play affordances that digital media offer (Frissen et al. 2013, 11-12). The play element is a quality that lies within the very nature of digital media: Virtuality and interactivity are two of these fundamental play affordances which I am going to use as a stepping stone before analyzing the rising interest of digital game based learning. Virtuality lies in the heart of digital media as it gives the user the affordance of immersion. The immersive experience is a result of simulation technology that forms a creative mix between the real and the virtual. Interactivity refers to the user's high level of power within the digital realm. Digital media provide to the user the privilege of intervention, in the sense that he has the affordance to transform the representation in a meaningful way. This is a small example of how media experience possess a strong playful quality. However, one could question how the playful element could be in any way related to the stereotypical seriousness of education. The ambivalence of the terms of the title – serious and fun - aims to illustrate the generalized shift of stereotypes that occurs in current digital

culture. Serious environments are starting to integrate the play element as an empowering tool of their original aims.

In the current paper, I will draw my attention in the serious environment of school. The marriage of a serious education and fun games is summarized in the newly coined term of edutainment. Although this scheme was criticized for its seemingly incompatible nature, an enthusiastic research on digital game based learning has shown that despite its phenomenal contradiction, digital games could be proved to be a fundamental tool for the optimization of education. "Games are effective not because of what they are, but because of what they embody and what learners are doing as they play a game" (Van Eck 2006).

Two trademark authors of the digital games based learning bibliography are Marc Prensky and James Paul Gee. As proponents of digital game based learning, both Gee and Prensky added fundamental writings to the ongoing research on the effectiveness of digital games. Prensky argued that the most important promise digital game-based learning can fulfill is the deep engagement of the learner. The high level of engagement lies in the fact that games tend to motivate the learners to train themselves in difficult subjects. (Prensky 2000, 32). The motivational power of these serious games in education lies in the fact that they provide players with a certain task that must be achieved. However, the intense enjoyment that derives from playing, makes the procedure of reaching the goal, fun and pleasurable. In such a condition, "players become committed to the new virtual world in which they will live, learn, and act" (Gee 2005, 34).This is the very nature that applies an effective quality in serious games: They can bridge the ambivalence between the serious and the playful. In the same spirit James Paul Gee argued that the most important

learning principle of the game lies in the extremely simply realization that in order to play a game you first learn *how* to play a game. (Gee 2005, 34). Gee approaches games as another semiotic domain modern students should be literate at. In accord to Gee, the radical changes that digital environment unleashes, makes print literacy an inadequate condition in the sense that it encloses students to a limited - and rather obsolete - way of approaching the world. According to Gee, the affordances of digital media and more specifically digital games could give education a new more meaningful, interactive and consequently effective dimension.

However, the core of these writings draw their focus on the efficacy of video games rather than the analysis on how and why they are effective. Additionally, one subject left under-analyzed is the concept of student's identity contraction through digital games. Gee argues that a good video game is the one that engages the player in an action and interaction, "a world to which the learner has made an identity commitment" (Gee 2003, 68). School is the basic site of the identity struggle. Educational attainment is a fundamental contributing factor for the orientation of adolescents' in their quest for identity. If digital game based learning's aim is to make a meaningful contribution to the educational process that could mainly be achieved by mentoring students in the self-identification process.

Identity Quests

Identity is not a static but a continuously transformable inner substance that finds its form through expression, action and interaction within the life realm.

In his classic psychological theory of the eight developmental stages, Erik Erikson traced the

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changes that occur in the ego identity in a lifespan. Ego identity is the construction of a conscious sense of self. The fifth stage of adolescence is described an era characterized by the struggle between identity and role confusion. According to Erikson, an adolescent's main mental focus is the "I could become" idea (Erikson 1968). Envisioning a potential future and the potential identities they could take on, absorbs adolescents in a quest for answers about self-conceptualization. In 1986, Hazel Markus and Nurious proposed the term possible selves in order to describe a state of fluidity, during which the adolescents' personhood is taking a more solid shape. This mental state is dominated by the notion "I could become", "I am afraid to become" and "I would like to become"(Markus and Oyserman 1990, 112). Consequently, the haunting and energy consuming task of adolescence is to succeed a smooth transition between the frivolity of childhood and the real-life responsibilities of adulthood. However, most of current adolescents are being found in a condition where this transition is a very hard step to accomplish. The problem harshens because of the educational gap that was discussed above. A digitally immigrant education is discontinuous with the needs of a digital native student. If the language of digital society changes dramatically, while the educational system remains immune to these changes, the adolescents face a double problem. Students must face the anxiety of their vague aspirations and developing identity, but with the absence of a sufficient mentor, since school cannot speak to its students with their own language.

In the next chapter I will make a brief introduction of Michael Shaffer's conceptualized as epistemic games in order to examine how effective such a proposal could be to solve the dual problem of Babel while helping adolescents walk through their quest for identity, especially in

terms of future professional careers.

Case study:

Urban science

Following Aarseth's template I will make a textual analysis of the Urban Science epistemic game by reading closely its design, rules and mechanisms. For the analysis of the aforesaid elements I collected Shaffer's articles and watched online videos with students on the playing action, followed by their reviews on their game experience.

Design

Urban science shares the same design principles with its brother epistemic games. The computational micro world (Hoyles, Noss and Adamson 2002) of epistemic games is based on creating the illusion of a simulated environment. More specifically, behind the design of the game lies an ethnographic study of an urban planning office. The realistic design of the virtual space provides students with an authentic medium for studying the complex problem of urban ecology (Shaffer and Beckett, 2005). Simulation presupposes what Roger Caillois described as mimicry. Epistemic games formula has a large component of this element: Mimicry revolves around a basic process which makes the

player escape himself and become another. The game begins when students receive a mail from the – virtual - major which is addressed to the – simulated - city planning department.

Rules

The rules of the game follow the same realistic line. Students – and active players - follow a traineeship program with all the restrictions, freedoms and practices that a real-life trainee would experience. More specifically in the simulated work environment students take on the virtual persona of urban planners and receive all the necessary materials of a real trainee in order to execute the assigned task: That consists of an city budget plan, the information about the revenue that is going to be redesigned and letters of concerned citizens concerning traffic, waste and crime. This role-playing formula is nothing more than a well-structured illusion, meaning that within this magic circle, the student are expected to follow the rules of a virtual yet strictly realistic work process. In accord to Caillois' notion of role playing, "the subject makes believe or makes others believe that he is someone other than himself. He forgets, disguises, or temporarily sheds his personality in order to feign another" (Caillois 1958, 19-20).

Mechanisms

Students have to use the iPlan, a mapping tool that allows them to change the zoning of different parcels on a site. As changes are being made, graphs appear in the interface that show the projective impact on issues that stakeholders care about. iPlan is an instrument that professional planners use in order to assess the response of the stakeholders and deliver results that will satisfy the different groups (Shaffer 2008). In Urban Science, players learn to collaborate, as they have to create teams and discuss their possible moves based on what stakeholders would find acceptable.

The current update of the game's engine can integrate action within the game as well as reflection of the action. This action and reflection follows the pattern of the real life action and reflection as these two would take place in a professional training. 2PS mechanism is designed as a shared workplace that simulates the work flow of a professional office. The main goal of the 2PS is to provide with the technological support for justification by tracing the student's process while asking appropriate reflective question in the desired time. More specifically, 2PS can check if a proposed GIS model that is designed by the student meets the criteria that are requested by the client. Based on that criteria an e-mail is generated to the student by a library of predefined responses. That

develops an interactive interface which guides the students for further action while controlling the overall result of providing various feedback sources. The desired result is the increase of the student's immersion in the simulated workplace.

Playing with professionals identities

In this chapter I will try to analyze the identity construction process in Urban Science using Jos de Mul's ludic identity theory (2005). That will assist in clarifying the game's dynamic in building a solid epistemic mentality in the students' identity. Ludic identity theory is the "gamified" version of Paul Ricouer's theory of narrative identity (1991). Ricoeur introduced the threefold model of mimesis 1, 2 and 3 to explain the complicated process of making meaning out of life experiences in and out of the connection with others. Narrative identity is oneself as another self.

Drawing on Ricoeur's theory of mimesis 1, 2 and 3, de Mul also discerns three stages in the ludic identity formation process which he conceptualizes as Play 1, Play 2 and Play 3. The numbers indicate the escalation process of the player's identity construction within the game space. By following de Mul's stages, I will trace how the professional identity of the adolescent can develop within the virtual space of Urban Science.

Play 1 refers to our experience our world as an infinite playful environment. Youngsters are daily involved in ludic practices, following the modern realm of playful media. Modern youth search for autonomy and identity the same way their predecessors did, however they do so by following completely different practices and patterns of play, self-expression and communication (Mitzuko et al. 2008, 4) Youth deeply invest in various digital media – and therefore playful – practices like browsing the net, creating profiles, connecting with peers in social sites, sharing photos and videos. Modern youth has a 'serious' commitment with digital culture. This is the 'language' that distinguishes them as a generation.

Play 2 refers to a Space of possible actions. These actions are determined by a set of rules which determines the possible moves of the player. In the realm of urban science students are called to follow the particular practicum of the urban planning profession. The possibility of actions is connected to the restrictions and freedoms that students experience within the simulation workplace. Students are trained to adjust their mindset and develop an epistemic thinking based on a specific set of rules the same way a real professional would. The space of possible actions is characterized by openness in the sense that it doesn't necessarily have a predetermined closure. In a classic game, beating our own score would be a good example of this lack of closure. In the same spirit, students are motivated by the reward of a success and work for the better possible outcome.

Play 3 refers to the final process during which the player identifies with the space of possibilities disclosed by the game as the infinity of outcomes is internalized. In the final state, following the set of rules is not simply an act of imitation but a result of identity incorporation. By following the game rules students are trained by the rules of the profession, learn to become active decision-makers planners and take on the responsibility of the positive or negative outcomes. As it was discussed above the 2PS engine reflects on player actions and defines the level of success of each student. That complements the experience as the student internalizes not only the cognitive

tools of the profession but also the epistemic mentality of the professional.

Conclusion: Professional orientation

Digital game based learning is starting to gain a lot of attention and respect in the past years. However the transition from theory to practice could be challenging in many ways as the traditional educational structures - organizational or teaching - have to be determinably altered for games to be smoothly integrated. My main argument does not include all digital games as education as that would make a rather generic and dangerous claim, since every digital game should be evaluated separately for its suitability to be part of an educational program. However, I argue that epistemic games could be a fundamental contributing factor in the optimization of education. If the spirit of times requires innovative thinking, flexibility and a high level of digital literacy, then epistemic games could be more than enriching for a school's course program.

Epistemic games could be integrated as an extra curriculum course in the last years of high school as a contributing tool in adolescent's professional orientation. By building an epistemic frame through the game, adolescents could make more responsible and solid life-changing decisions, while resolving their identity anxieties and clarifying their professional interests. The identity experimentation that epistemic games afford to students could effectively prepare them for the game of life.

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Notes

[1] Marc Prensky coined the term digital natives and digital immigrants in the book "Digital Natives, Digital immigrants"

(2001b), in order to illustrate the incompatibility between the two generations before and after the dominance of digital

technology. The term "digital natives" refers to the generation that is brought up in an explicitly digital environment.

YOU PASSED LEVEL 4
GO TO THE NEXT LEVEL

LEVEL 5

EMMA NORTON

RUN FOR YOUR LIFE:
AN EXAMINATION OF ZOMBIES, RUN! AND THE USE OF NARRATIVE PERSUASION IN EXERGAMES.

ABSTRACT - This paper explores theories of rhetoric within play and games, and critically assesses Ian Bogost's work on the subject of rhetoric in exergames in order to investigate the possibility of narrative being employed persuasively within such games to encourage players to exercise. An examination of the case study of the mobile exergame *Zombies, Run*! is undertaken to determine whether or not the game's narrative can be seen as a rhetorical tool to persuade players to exercise. Analysis of testimonies from Zombies, Run! players suggest that elements of narrative persuasion, namely the process of *transportation*, are utilised effectively in the game to encourage physical activity. This paper therefore concludes that narrative can indeed be used within exergames as a form of rhetoric, but suggests that more research is needed in order to explore in greater depth the psychological and behavioural changes that a rhetoric of narrative can achieve within exergames.

Introduction

In an interview with *Polygon* in July 2013, Naomi Alderman, co-creator and lead writer for the increasingly popular mobile fitness app, *Zombies, Run!*, stated plainly and simply her opinion on why the game she helped create is unique: "Nobody else is talking about doing narrative fitness games" (Gera, 2013). Indeed, Alderman's assertion is true. *Zombies, Run!* is a phenomenon within the world of exergames, (cleanly defined by Ian Bogost as video games which combine play and exercise (Bogost 2005)). Whilst other mobile exergames such as *Endomondo Sports Tracker* and *Nike+* focus predominantly on using gamified elements to help persuade or motivate players to exercise, *Zombies, Run!* appears to use an immersive and entertaining narrative, delivered to the player through headphones and mixed in with a playlist of running songs to keep them coming back for more. Since the success of their *Kickstarter* campaign in 2011, Alderman and the London-based games developers *Six to Start* have netted sales of over 400,000[1] copies of *Zombies, Run!*, and the number of converts seems to keep on rising. So, what exactly is it that is making *Zombies, Run!* so popular? What is it about the game which, according to the developers' claims, has motivated a surprisingly large number of people to take to the streets (or to treadmills) around the world and run a collected 11,000,000 km[2] ? Just what is it that makes the game persuade its players to exercise?

In order to approach these questions, the first chapter of this paper will examine the use of the concept of 'rhetoric', and how it can be used within play and games theory by laying out definitions, uses and understandings of the term. Within the field of play, I will explore Brian Sutton-Smith's seminal work 'The Ambiguities of Play' (1997). I will then consider a study of rhetoric taken from the world of games studies, analysing Ian Bogost's use of the term and how

rhetoric can be used in 'persuasive games' by exploring the concept of *procedural rhetoric*. The second chapter will then go on to critically assess Bogost's writing on 'The Rhetoric of Exergames' (2005) in which he assesses the history of exergaming and establishes five clear types of rhetoric which can be found within these games. In a critical analysis of Bogost's work, this paper will argue that new developments in the field of exergaming mean that his article needs to be updated – it can also be argued that Bogost should look at exergames in a more rounded way, moving away from a strictly formalist approach. The third chapter will focus on the case study of Zombies, Run!, and an attempt will be made to develop Bogost's formalist approach, moving towards an analysis of the game which also takes into account its subjective impact on players. This will require a textual analysis of player testimony which can be found on the Zombies, Run! website to try and ascertain what aspects of the game are most important in persuading or motivating[3] its players to exercise. The paper will then go on to argue that *Zombies, Run!* provides a strong case for a rhetoric of narrative being present within exergames, where the power of immersive storytelling is utilized to draw players into the game, and to encourage them to take interest in and derive entertainment from exercise. It can be argued that this apparent power of the *rhetoric of narrative* (or narrative persuasion[4]) calls for a reassessment of current discourses within game studies which often look solely from a ludological perspective and which reject the potential for games to be influenced by narratology. This third chapter and conclusion will therefore move towards answering the following research question: *What is the role of narrative in exergames*?

Defining 'rhetoric', and its role within play & games

In order to understand how exergames such as *Zombies, Run!* may possess a persuasive or motivational quality to aid its players in exercise, it is necessary to address the concept of persuasion from a theoretical and philosophical standpoint, by examining the concept of 'rhetoric'. Rhetoric has classically been associated with discourse[5], and with speaking and writing persuasively. For instance, rhetoric has been defined by Aristotle as, "the faculty of observing in any given case the available means of persuasion" (Aristotle 2010). Yet more modern interpretations have attempted to move beyond seeing rhetoric solely in terms of spoken and written discourse, and theorists such as Roland Barthes (1977) have attempted to argue that rhetoric can exist within images. James P. Zappen has also argued for the concept of *digital rhetoric*, and that such a term can "help to explain how traditional rhetorical strategies of persuasion function and are being reconfigured in digital spaces" (Zappen 2005, 319). Zappen's analysis helps to clarify how rhetoric can be seen as more than just a concept based on persuasive writing, speaking, or images. Rhetoric is also observable within the digital world and, as Zappen argues, this encompasses computers, digital texts, digital interfaces. Moreover, as is demonstrable in this paper, rhetoric can also be utilised within the fields of play and video games.

In his 1997 article 'The Ambiguity of Play', Brian Sutton-Smith used the concept of rhetoric in order to help theorists like himself negotiate the substantial 'ambiguities' within the study of play. Sutton-Smith states that he defines rhetoric in its 'modern' sense, as "a persuasive discourse, or an implicit narrative, wittingly or unwittingly adopted by members of a particular affiliation to persuade others of the veracity and worthwhileness of their beliefs" (Sutton-Smith

2006, 302-303). Yet, in exploring the concept of rhetoric within play, Sutton-Smith is not seeking to clarify how rhetoric is used within the act of play itself, such as children playing with wooden blocks, or adults playing chess or poker. He is instead looking at rhetoric within the academic landscape, by play theorists who attempt to understand the different types of play that exist culturally; so "the rhetorics of play express the way play is placed in context within broader value systems which are assumed by theorists of play rather than studied directly by them" (Sutton-Smith 1997, 8). By looking at the way that theorists talk and classify play through certain rhetorics, Sutton-Smith argues that we can develop a better understanding of the highly ambiguous concept of play. He defines seven types of rhetoric within play theory: the rhetoric of play as progress, as fate, as power, as identity, as the imaginary, of the self, and as frivolous. Though it is not necessary to explore each of these categorisations in detail, they can help to explain how theorists have thought about play and its defined purposes and uses within society. In his Phd thesis, 'Play the Message', Gonzalo Frasca argues:

> Sutton-Smith's typology of play themes is useful in order to understand play s role in our culture. However, it does not directly deal with the processes and techniques through which play conveys meaning, which is the main interest of play rhetoric as a discipline
> (Frasca 2007, 82).

Indeed, as Frasca clarifies, Sutton-Smith's analysis of rhetoric within play is useful in understanding how theorists conceptualise play, and how discourse (and, by extension, rhetoric), convinces

readers to think about play in certain terms; it does not focus on how the act of play itself can be persuasive. This is, however, explored in the field of game studies, where theorists such as Ian Bogost examine how rhetoric can be used within games (Bogost's focus is predominantly focussed on video games), and how *playing* these games can transfer rhetorical messages from the designer to the player. Frasca describes this phenomenon as 'play rhetoric', which he defines as "the use of play in the creation of meaning" (Ibid, 88) and also as "persuading players into modifying their ideas and actions"(Ibid, 28).

It is Ian Bogost who is arguably the most influential theorist studying the concept of rhetoric within games, and in his 2007 book 'Persuasive Games: The Expressive Power of Videogames', he concurs with Frasca's argument that Sutton-Smith's analysis of rhetoric within play is useful in a general sense for understanding the "cultural role of play" (Bogost 2007, 52), but Bogost goes on to state that his interest is not in studying play but in "the function of procedural representation as it is used for persuasion, and in video games as a sub domain of procedural media." (Ibid) Bogost is interested in "discussing the rhetorical function of procedural expression in the tradition of representation rather than the tradition of play"(Ibid, 53), and, unlike Sutton-Smith, he therefore believes that

the more useful intersection between rhetoric and play is one that unpacks the particular rules of a particular game in a particular context, not the more general intersection between modes of play in general

(Ibid, 54).

Bogost is arguing for a focus on rhetoric within games which is conveyed through *proceduralism* – a *procedural rhetoric*, which he defines in his essay 'The Rhetoric of Video Games' as "the practice of using processes persuasively" (Bogost 2008, 125). This concept of procedural rhetoric is central to Bogost's conception of how games can be persuasive– suggesting that video games possess rhetoric because they can "make argument with processes" (Ibid). So, Bogost makes very clear here that rhetoric, (and by extension persuasion and meaning), comes from a game's rules and other formal elements. This concept of procedural rhetoric is central within the study of *persuasive games*, an area on which Bogost has also heavily focussed his attentions, being the founding partner of a game developer called *Persuasive Games*.[6] From this study of the work of Sutton-Smith and Bogost on the concept of rhetoric within play and games, it is possible to conclude that rhetoric not only shapes theoretical discourses on play, but is also implemented in a practical way within video games, and specifically within persuasive games. Bogost's view suggests that it is designers who utilise procedural rhetoric in order to influence and persuade the player towards certain beliefs or ideas. Furthermore, such proceduralism has been used to develop a specific genre of games, which falls under the banner of 'persuasive games' and works to persuade players to think or act in certain ways or embrace certain ideas and principles.

Rhetoric, design and logistics of Exergames

Now that it has been established how rhetoric can be viewed within play theories, and also within the design of games, through the concept of procedural rhetoric, it is necessary to proceed to explore the category of games that this paper focusses on; *exergames*. In order to do this, it is

worth again turning to Bogost, and his exploration of the use of rhetoric in exergames in his 2005 essay 'The Rhetoric of Exergames'. As mentioned in the introduction of this paper, Bogost defines exergames as video games "that combine play and exercise" (Bogost, 2005). Though Bogost does not actually define what he means by 'rhetoric' within exergames in this work, he does state that his aim within the essay is to "seek to understand the ways that [exergames] motivate their players to engage in physical activity" (Ibid). So, he is clearly looking at 'rhetoric' as a form of motivation and engagement. Bogost's 2005 essay also forms part of his 2007 book, 'Persuasive Games' in which he lays out his ideas about procedural rhetoric in video games (as explored above). From this, it is also reasonable to assume that when Bogost is looking at rhetoric within exergames, he is looking at the use of *procedural rhetoric*, found in the game's formal systems and rules. Certainly, in both his explorations of exergames, Bogost takes a formalist approach. In doing so, he defines five types of 'rhetoric' within a variety of different exergames, which he categorises as the rhetoric of running, agility, reflex, training, and impulsion. Bogost's study of exergames is important in helping to trace the history of this field of game development, acknowledging that though exergames have been treated as a relatively modern phenomenon, they have existed since the mid-1980s, in games such as Exus' *Foot Craz* designed for the Atari 2600, which used a foot pad based on a basic design principle not dissimilar to the widely popular modern game *Dance Dance Revolution* (commonly known as DDR).[7] His work also acknowledges the specific formal systems used in such games in order to persuade players to exercise in some form, and this is certainly useful in terms of helping understand the games from a design perspective. However, in some sense, this approach can also be seen as fairly superficial. In looking solely at the formal properties which make up exergames, the

hardware they use, their rules and the logistical problems in trying to exercise within the confines of the average family living room, Bogost fails to appreciate the impact that these exergames have on players – why do people play these games? What is it about the games that persuades players to exercise? These questions are neglected by Bogost's study as he approaches the subject from a solely procedural viewpoint. His essay also epitomises one of the fundamental issues in the study of exergames: there have not been enough studies[8], not enough sustained evidence produced[9] in order to ascertain how the rhetoric and game design of exergames impact on players and how that persuades or motivates them to exercise.

As well as this, Bogost's paper was written in 2005 (and was only slightly expanded upon in his 2007 book). This means that his analysis is now outdated. In particular, the date of publishing rendered Bogost unable to reflect upon the emerging field of mobile exergames, which have had a significant impact on the industry thanks to the boom in smartphone use (predominantly in MEDCs[10] within Europe, North America, South Korea and the Arab Emirates[11]). Wylie and Coulton (2009) explain how mobile technological developments have impacted the health and exergames market:

> the increasing power of mobile phones and the ability to connect them between emerging health monitoring devices, as well as their adaptability to the mobile health sector, is making it possible to develop and deploy mobile heath promoting applications at low prices to an ever growing mobile community
>
> (Wylie and Coulton 2009).

The growth of mobile exergames also overcomes one of the points Bogost makes in his essay and book on exergames and the constraints of the family living room; with many games "demand[ing] considerable freedom of movement around the player, including open space on all sides to avoid injury in the case of a misstep (Bogost 2007, 314). Yet, Bogost's wider point that "Logistical and technical limitations also stand in the way of exergame play" (Ibid, 315) still stands. Many mobile exergames are dependent upon players exercising whilst also trying to focus on the screen of their hand-held mobile device, which is obviously logistically counter-productive to effective exercise (Marshall and Tennent 2013). As the next chapter will explore, however, such issues can be overcome, and the case study of *Zombies, Run!* will illustrate this. Overall, since Bogost is considering exergame rhetorics from a design perspective, the fact that he has been unable to comment on the design of new mobile exergames leaves a major gap in his examination of the persuasive and motivational abilities of this new section of the market.

The Rhetoric of Narrative and the case of Zombies, Run!

Zombies, Run! was created by the independent London games developers Six to Start after a successful kickstarter crowdfunding campaign which raised over 72,000 USD (exceeding the developers' original funding goal by 60,000 USD). Even in its earliest stages the game, which is now available as a mobile application for Apple iOS and Android users, showed signs of significant popularity for its originality and for simply being a great idea. Now in its second 'season', the game has sold over 400,000 copies and become "the world's most successful smartphone fitness game ever".[12] Yet in order to understand this popularity, it is necessary to consider just what it is about the game that makes it function as an exergame – what is it that persuades players to actually play the game and exercise? It is first worth exploring the game from a formalist perspective, in order to attempt to identify which procedural rhetoric may be being utilised.

A Formalist Approach to Zombies Run

In their brief analysis of the game, Chittaro and Zuiliani describe that its basic aim is to "complete a series of missions with different goals (such as finding a certain object or gathering supplies for the survivors) by performing a running session" (Chittaro and Zuliani 2013). This is achieved by combining a player's music playlist (intended to consist of music tracks which will help the player to run) with "dynamic radio message and voice recordings"[13] which are intended to immerse the player in the world of a zombie apocalypse. Missions take either 30 minutes or 1 hour, depending on a player's preference. When audio clips are not playing and the player's own music is being listened to, there will be periodic updates which tell the player that they have collected items, or updates on the location of approaching zombies. The game offers two tracking modes - accelerometer and GPS– both track a player's progress, offering pace and distance information. Some devices which are compatible with Zombies, Run! (such as iPods) don't have GPS, so players have to use the accelerometer option, and some people with smart phones prefer to use this mode if they're sensitive about location information gathering. However, because accelerometer doesn't collect location data it can only show a player their step count and estimated distance. The GPS tracking mode offers more comprehensive information about a player's run, generating maps of

runs online (with information about which songs in the player's playlist made them run faster or slower, or information about points at which they were caught by zombies within their run) because it has location data that syncs to a player's online *ZombieLink* account. Since the 'running' element of the game is all based on audio instructions, the game avoids the pitfalls of many other mobile exergames, as there is no need for players to look at their phones whilst on 'missions'. It is not until a player returns home that the 'video game' element of the app comes into its own. Once players have finished their runs, they can build up their Abel Township base on their mobile device, building elements such as armouries and defence towers. The more missions a player completes, the more they can improve their base. Players can also sign in to *ZombieLink*, an online portal where they can assess their mission progress, running stats and achievements.

Having looked briefly at the formal systems of the game such as the goals, rules and technical aspects, this analysis has functioned in a similar way to that used by Bogost in his essay 'The Rhetorics of Exergames'. However, from the anaylsis above, it can be argued that it is difficult to see how *Zombies, Run!* fits into any of the five categories of rhetoric established by Bogost. The most obvious rhetoric one could consider the game to be employing is Bogost's concept of the *rhetoric of running*. Bogost states that games which use a rhetoric of running do so by "simply borrow[ing] the model 'button-mashing for sprinting' and adapt it to the player's feet" (Bogost 2005), for example Athens 2004 for Playstation 2, which was played on a dance pad and required players to participate by 'button-mashing' with their feet to simulate running. Clearly, *Zombies, Run!* does not implement this kind of rhetoric, and it can be suggested that it certainly does not fit within the forms of exergames which are dependent on the rhetoric of reflex, impulse or

agility. In fact, the closest potential use of one of Bogost's forms of rhetoric within *Zombies, Run!* is that of training, as the missions of the game are often heavily based on the motivational words of encouragement from the 'radio operator' Sam Yao, who could, in some instances, be seen as the player's personal 'trainer', encouraging the player to run at certain times, and to keep going at potentially difficult points . However, unlike Bogost's clarification of the rhetoric of training, Sam does not act overtly as a 'personal trainer', he does not "[recommend] the proper exercises and [ensure] that the client carries them out properly, for the most effect and to avoid injury" (Ibid). Despite the fact that some elements of *Zombies, Run!* do fall into Bogost's definition of exergames which use a rhetoric of training in order to motivate players, it can be argued that it is not the central rhetoric used by the game. It can be suggested that there is another more essential factor at play within the game which persuades players to exercise, and engages with them on a more subjective, personal level.

The role of narrative

In order to analyse the other elements of *Zombies, Run!* which may be persuading or motivating players to exercise, it is necessary to look at the game from a non-formalist perspective, by looking at what the players have to say. Player testimonies displayed on the *Zombies, Run!* testimonials webpage, which were compiled after the developers requested players to share their experiences, describe how the game worked for them and how it impacted upon their lives.[14] Taking the first fifty testimonies available on the *Zombies, Run!* testimonials webpage[15], this paper undertakes a textual analysis[16] to move towards an interpretation of what elements within the game are most

commonly stated as reasons for motivating players to exercise, in order to derive from this a concept of what kind of rhetoric the game employs. The results were clear; thirty three out of the first fifty testimonies[17] from the *Zombies, Run!* testimonials webpage, specifically referred to the 'plot', 'story', 'narrative' or 'characters', and to the importance of these elements in persuading them to exercise by immersing them in the narrative and engaging them in the game. From this evidence, which will be analysed in more depth below, it is possible to suggest that *Zombies, Run!* moves beyond Bogost's categorizations of rhetoric within exergames, and that the game motivates players to exercise through the use of a *rhetoric of narrative*, or narrative persuasion[18]. There has been an extensive debate within the field of game studies about the place of narrative in games; most notably in the 'narratology vs. ludology' debate, in which many games theorists refute the place of narrative within games, with commentators claiming that "Computer games are not narratives" (Juul, 1998) as "there is a direct, immediate conflict between the demands of a story and the demands of a game" (Costikyan 2000). These arguments are embraced by 'ludologists', 'game essentialists' or 'computer game formalists' who, as Janet Murray argues, "want to privilege formalistic approaches [to games studies] above all others" (Murray 2005). Therefore, "they are willing to dismiss many salient aspects of the game experience" (ibid), which include elements such as the narrative, the feeling of immersion, and other emotional connections players may make to a game. Commentators such as Henry Jenkins have tried to find a happy medium between the two discourses, arguing that incorporating narratology into game design can be useful and serve to help develop and diversify the field, whilst also acknowledging that incorporating narratology in game studies will not suddenly turn games into films or books; since "if some games tell stories, they are

unlikely to tell them in the same ways that other media tell stories" (Jenkins 2004, 120). Though many theorists, like Jenkins, have now come to acknowledge that narrative *can* play a role within games, it is arguable that Bogost's approach to exergames very much comes from the ludological or formalist approach. Therefore, claiming that there is a *rhetoric of narrative* within *Zombies, Run!*, which can be seen as the key persuasive element in the game, is not an attempt to reenact this debate on narratology vs. ludology. It is instead hoped that, as the analysis below should support, in this particular exergame, narrative is key to persuading players to exercise by immersing them in the world of Abel Township.[19] Though this exergame may be the first to utilise a rhetoric of narrative, it can be seen that narrative persuasion has been explored within the study of health education (Lu et. al. 2012), and more recently also within the study of 'Video games for your health' (ibid), both of which can be usefully applied in the analysis of *Zombies, Run!*, alongside more general studies of narrative persuasion.

Transportation and narrative persuasion

One of the central elements of narrative persuasion, which has been established by various studies, is the concept of 'transportation'. Green and Brock (2000) defined transportation into a narrative world as "a distinct mental process, an integrative melding of attention, imagery, and feelings" (Green and Brock 2000, 701). Transportation is seen to lead to persuasion due to three factors. Firstly, those who are 'transported' experience a suspension of disbelief, which means that they are "are so absorbed in the story that they are less likely to counterargue and therefore come to believe the story propositions" (Hinyard and Kreuter 2007, 781). Secondly, transportation acts to " [make]

the story seem more like actual experience" (ibid) and thirdly, transportation can lead individuals to "identify with or develop strong emotions for the characters of the narrative, making their perspective have greater influence on the beliefs of the reader/listener/viewer" (ibid). Though the effect of transportation varies from person to person, Appel et. al. argue that empirical studies have consistently revealed that "The more transported by the narrative, the more recipients endorsed story-consistent beliefs" (Appel et. al. 2011). The testimonies from *Zombies, Run!* players that I analysed revealed a high level of 'transportation' into the narrative. Evidence that players were experiencing a 'suspension of disbelief' was found in several testimonies, where they actually began to believe that they were entering another 'world' whilst using the game. For example, Gary O'Daly's testimony stated, "Zombies, Run! is not just a running App, it is another world for me that I escape to for a few 'hours every week". He goes on to state that "it is a driving force in getting me out running, enjoying running and striving to be a healthier, fitter person". Here, we can also see the element of transportation associated with personal experience – the story is now forming part of the player's routine, and affecting his life in a positive way. Similarly, the player GamerFix clearly shows signs of transportation within the narrative, which has the effect of helping him/her to run;

I get up, put running gear on, light the fireplace so it's warm when I come back to base. Slowly I immerse into another universe where post-apocalypse survival gives meaning to running around. Now I have an aim, a goal and better achieve it if I want to keep my brain.

Clearly, these two testimonies show the potential of these first two elements of transportation,

and the persuasive effect that these have on players. Yet, there is one element of transportation which *Zombies, Run!* player testimonies have suggested is particularly strong in persuading and motivating them to exercise, and this is the role of characters, and the emotional engagement that players develop with these characters within the narrative. A player named Vanessa stated "Zombies, Run! makes you feel for the characters and I am emotionally invested in this app. I trust those characters to lead me in a direction that's safe and I push myself harder if a character is in trouble." Sam Yao, the 'radio operator', who is the lead character in the game, was referenced several times as being a significant factor in players' motivation to keep running. One player named Max Carnage stated; "Sam Yao is like a brother to me. A real comrade in arms and a voice of reason and comfort in the dark times." Another player, Jennifer Lee, stated that she completed a 5k run with a personal record because of her emotional engagement with Sam's character, stating; "Sam was staying up all night talking to me, not sure whether I was alive or dead, and I had to make it back to tell him how ice cream rolls were made. When I crossed that finish line, I fully expected to see the comms shack". Clearly, players of *Zombies, Run!* are 'identifying' with the characters in the story, and this concept of identification has been established as a key component of narrative persuasion. De Graaf et. al. argue that "Identification is proposed to be one of the mechanisms through which narratives can change attitudes" (De Graaf et. al. 2012, 804), as it is seen as a means "through which audience members experience reception and interpretation of the text from the inside, as if the events were happening to them" (Cohen 2001, 245). Studies have also suggested that "the perspective from which a narrative is told may be a suitable means to manipulate identification", so since the narrative of *Zombies, Run!* predominantly features the character of

Sam Yao, this is the character (as supported by the testimony above) that players tend to identify with the most. As a result of this, it is possible for Sam to become persuasive, he is able to motivate players to run because they engage, sympathise and even like him as a character.

Yet it is not just these elements of narrative transportation which players noted in their testimonies; many also made clear that the narrative was in a way 'addictive'. A player named Kas stated in her testimonial; "What I fell in love with was the -story- […] I was totally hooked pretty much instantly." The word 'hooked' was used by many players in the sample testimonies, and one even suggested that the desire to follow the story within the app was equivalent to "finish[ing] a book or watch[ing] the next episode of a TV show". Indeed, several players expressed how the desire to finish the mission, and even move on to the next instalment within the same running session, is driven by the storyline. Liana Brooks stated, "The story keeps me going. I look forward to my next run because it means I get to go back to the world of Able", and similarly BradF made clear that "The story is so well written, I have been known to extend my run […] so I can get in another chapter."

From this analysis of testimonies, it is possible to see how narrative can be used within exergames in order to persuade and motivate players to exercise. Moreover, by conducting an analysis from the perspective of the game's players, rather than from a purely formalist viewpoint, this study can reveal how players are persuaded and motivated to exercise by the existence of immersive, transportive narrative within *Zombies, Run!* From this, it is viable to argue that *Zombies, Run!* predominantly functions by playing upon a *rhetoric of narrative*, which acts to persuade players to exercise.

Conclusion

By exploring the case of *Zombies, Run!* it is possible to conclude that narrative can be used in exergames and that, in this case, it is narrative which plays a crucial role as a form of rhetoric within the game, persuading and motivating players to exercise predominantly through the process of *transportation*. So, what does this conclusion mean for the world of exergames? Considering the commercial success of *Zombies, Run!* and the quite astounding dedication of its fan base, this game could potentially serve as a new model for exergames. Indeed, the game's developers, *Six to Start*, are currently working with the United Kingdom's National Health Service (NHS) in the development of a brand new mobile exergame, *The Walk*[20], with a similar use of narrative for persuasive purposes. There has also been the emergence of a narrative-based fitness app, *Runtastic Story Running*,[21] which appears to be a potential competitor to *Zombies, Run!*.

Yet, in order to develop a fuller understanding of the complexities involved in how a rhetoric of narrative within exergames may persuade players to make behavioural changes, considerably more study of the game and its players is required. Such research would require empirical studies and interviews with players in order to get a much more substantiated analysis of the impact of the game's narrative on behaviour and psychology the player. Indeed, it will also be interesting to study *Six To Start's* next game, *The Walk*, and to measure its success in order to begin to ascertain whether this concept of a narrative of rhetoric can be effective in more than one case study. On top of this, it would be interesting to investigate Alderman's assertion that "Emotions are often heightened by exercise," (Gera 2013) and that this may assist in the *transportation* process, making the narrative even more persuasive.

Finally, *Zombies, Run!* serves as an interesting experiment in the positive creative possibilities that can come from bringing authors and game developers together, something that 'narratologists' have suggested within the now rather stagnant 'narratology v. ludology' debate. Alderman is a staunch advocate for such a method in order to overcome "a general problem with stories in games", stating "people who are interested in story and people interested in technology are put into different educational buildings from the time they're about 15 years old, so those people just don't talk to each other" (ibid) . Such interdisciplinary collaboration can be seen as being of benefit to both the study and practical design of games and exergames, and, contrary to some ludologist's assertions this, "need not imply a privileging of storytelling over all the other possible things games can do, [but] […] we might suggest that if game designers are going to tell stories, they should tell them well" (Jenkins 2004, 120).

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Notes

1 'Zombies, Run! 2 Press Kit', Zombies, Run!, (April 16, 2013), retrieved November 9, 2013 from https://www.
zombiesrungame.com/press/

2 This figure is displayed on Six to Start's official Zombies, Run! website, and the data is taken from runs logged online
by players, see "Join a Worldwide Community of Runners", Zombies Run, retrieved October 29, 2013 from https://www.
zombiesrungame.com/

3 This paper avoids using the term 'persuade' on its own in relation to exergames, as it can be said that many exergames use
rhetoric in a different way than other serious/ persuasive games by focussing on trying to 'motivate' players to exercise rather
than to solely 'persuade' them.

4 This is the term used for narrative that is used persuasively within the field of narrative study.

5 See (Plato 2013).

6 See 'About Us', Persuasive Games LLC, retrieved November 5 2013 from http://www.persuasivegames.com/about/

7 For a more detailed explanation of Foot Craz, see (Bogost 2005).

8 Cf. (Staiano & Calvert 2011, 17–21; Boschman 2010, 235-238).

9 For a study on the lack of research and data on exergame use over time, see (Macvean and Robertson 2013)

10 More economically developed country

11 For research on smartphone penetration worldwide see (Fox 2013).

12 'About us', Six to Start, retrieved 30 October, 2013 from http://www.sixtostart.com/about/

13 'Over 90 Runs of Gripping Story and Gameplay', Zombies, Run!, retrieved October 30, 2013 from https://www.
zombiesrungame.com/

14 This selection process cannot present an absolute cross-section of players; those who wrote to the company are
highly likely to have done so because they have had a positive experience from the game, however, for the purposes of
understanding what elements work to motivate players within the game, this methodology should convey some interesting
and useful insights.

15 'Customer Testimonials'. Zombies Run Game, retrieved November 2, 2013 from https://www.zombiesrungame.com/
testimonials/

16 Textual analysis is defined by Bonnie S. Brennen as "When [...] we evaluate the meanings found in texts and we try to
understand how written, visual and spoken language help us to create our social realities" (Brennen, 2013 p.193). This paper
aims to look at the language used within player testimonials and to see what this can reveal about the persuasive tools used
within Zombies, Run!.

17 I took the first fifty testimonies available on the web page, but did not read them prior to selection and had no knowledge
of their content except for the fact that they are 'player testimonies'. It should be noted that the testimonies were gathered by
Jem Alexander, the company's Public Relations Manager. Over seven hundred testimonials were gathered after the company
issued a request for player feedback on it's Tumblr site on May 28, 2013. The company asked players to fill in a short survey.
Over seven hundred people responded to the survey, and the results are publicly available on the Zombies Run Website:
https://www.zombiesrungame.com/testimonials/.

18 Narrative persuasion, defined as "narratives [that] can have effects on readers' real-world beliefs and attitudes", (De Graaf
et. al. 2012, 802) is an existing term within the study of narrative, and so I use the term rhetoric of narrative as an alternative
to this term, playing upon similar wording to that which is used by Bogost in his categorisation of rhetorics in his essay 'The
Rhetorics of Exergaming' (2005).

19 It must be acknowledged such focus on narrative is not intended to neglect or refute the formal systems of the game which

assist the rhetoric of narrative within Zombies, Run!. The success of the narrative in immersing players into the game and

the world of the story is assisted by the hardware and technological elements that the game uses. The headphones which

deliver the story direct to the player, the GPS tracking or accelerometer mode to keep track of a player's location or step

count, the base builder and the app's interface which allows the player to engage with the story even after the run is over,

these all play their roles also.

[20] For more information about the game, see (Gera 2013).

[21] For more information on this app, see 'Story Running', Runtastic, retrieved November 3, 2013 from

https://www.runtastic.com/en/storyrunning?utm_source=newsletter.runtastic&utm_medium=mail&utm_

campaign=promo&utm_term=2013-10-31&utm_content=storyrunning_landingpage

YOU PASSED LEVEL 5
GO TO THE NEXT LEVEL

EMMA NORTON   **RUN FOR YOUR LIFE**
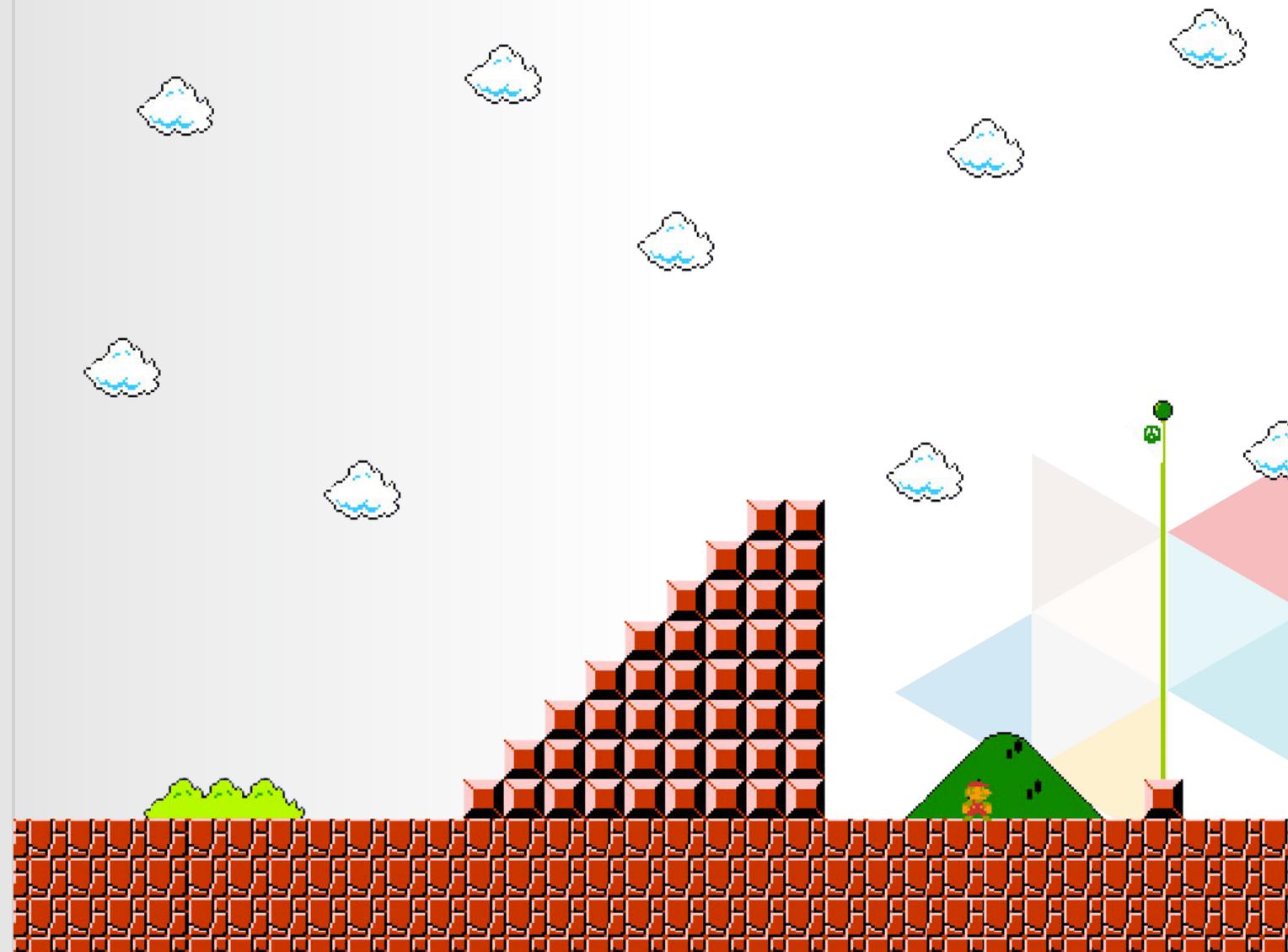
LEVEL 6

KEVIN WILLEMSEN

POLLINATION OF POLITICS: POLITICAL POLLS AS POLLEN FOR THE GAMIFICATION OF POLITICS.

ABSTRACT - Politics, in our contemporary network society, is too difficult to understand to a satisfactory level without gamification. This gamification comes in the form of casual politicking, making politics accessible to large numbers of people. Casual politicking works like a system of 'pollination' which needs polls to migrate through it. Polls, in turn, have flawlessly adapted to casual politicking by easily migrating between platforms and people, who can spread specific parts of a poll and thereby become pollinisers themselves. If several polls in a row show a party either gaining or losing prospected seats, people will quickly believe that a trend is going on. Polls thereby mediate trends more so than events, and can be called 'trend media'. These ideas will be illustrated by a case study focusing on the Dutch general elections of 2012. It will thereby become clear that communication about polls is to a large degree structured by the results of successive polls themselves.

Introduction

The elections for the Dutch Tweede Kamer (House of Commons) in 2012 concluded on the 12th of September. The results were clear: two parties with a very different ideology, PvdA (Partij van de Arbeid; Labour party) and VVD (Volkspartij voor Vrijheid en Democratie; Liberal party) would be forced to rule the country together. VVD obtained 26.6% of the votes, while PvdA had 24.8%. The third largest party received only 10.1% of the votes. This meant there was practically no way a majority could be formed without these two opposites in a parliament together. In short, the outcome promised an interesting future to say the least[1].

Even more interesting, however, were the few weeks that preceded the 12th of September. Only a month prior to election day, the liberals of VVD were not even bothered by PvdA. They were instead involved in a head-to-head battle against the socialist party, SP. However, in roughly four weeks, SP lost all of the leverage it used to have in the polls, losing about 11-17 prospected seats (7.3-11.3% of the votes)[2]. In that same period, PvdA gained about the same amount. In a multi-party democratic system like the Dutch, this can make a tremendous difference. I believe the case sketched above can illustrate a 'pollination' of politics: a process whereby political polls are being distributed, especially on social media, following the same logic according to which pollen are distributed from one flower to the next. Thereby, people participating in this distribution process focus on very specific trends that they pick out of a larger pool of information they could focus on. Subsequently, a trend is born like the one favouring PvdA and diminishing the chances of SP. This particular appropriation of polls ties in very well to the overall gamification of politics, for which polls serve as fuel (or pollen) to make it work.

In the first part of this paper, I will explain why gamification in politics exists at all and in what way it manifests itself, relating politics to Manuel Castells' idea of a global network society and Alex Gekker's model of casual politicking. In comparing Gekker's model to contemporary political polls, it will be clear that polls fit into his model very neatly. After that, it will become clearer why I think polls have such a great impact on people's perception of politics. The psychological theory of the 'bandwagon effect' and Brian Massumi's idea of an 'event medium' support the idea that polls are very influential entities because of how they shape our perspective on politics. The final part of this paper will consist of a closer look at the case study of the elections in 2012 I mentioned at the start, which serves to illustrate these ideas.

Network society and gamification

In 1996, sociologist Manuel Castells claimed that we are living in a network society, a "society whose social structure is made around networks activated by microelectronics-based, digitally processed information and communication technologies" (Castells 2009, 20). Because of the increasingly rapid way people can communicate with each other globally, he says, the network is the organisational structure that fits our situation the best. This is because networks are flexible and scalable enough to quickly allow new connections to be made and their distributed nature means they can survive attacks from the outside (Castells 2009, 23). Vertically managed hierarchies, on the other hand, struggle to keep up with the speed at which a situation can change nowadays.

Even so, Jane Fountain (2005) observed that governments tend to adapt to changes like these at a much slower rate than the technological change, usually taking about a generation (25

years) to make a full change (151). However, she performed her research right before the time when social media platforms became abundant. In the years since then, social media have become a huge platform for political debate (Shirky 2011; Christensen and Bengtsson 2011; Loader and Mercea 2011), making 'listening' to online conversation all the more important (Crawford 2009). Therefore, all layers of government are trying to find ways to immerse themselves in networks forming around particular issues, thereby submitting themselves to the logics of the network society[3].

This makes for a very complicated political situation, one that challenges the nature of representative politics (Hendriks 2002). Political influence is gained not by simply being elected into an office, but by "spheres of governance" (Hartzog 2005), which potentially exist of public, commercial and scientific bodies and individuals (and anyone else who does not fit in this trichotomy). These networks usually form around specific issues, meaning there is a wide array of flexible "issue networks" at play at any time to influence decision making (Marres and Rogers 2005). As stated above, governments naturally try to participate in these networks themselves, admitting that rigid hierarchy is no longer a valid way of driving political decisions.

The complex nature of contemporary politics based around flexible network structures brings me to the concept of 'gamification'. This is because our political situation being more complex than ever does not mean that we don't even try to comprehend it anymore. On the contrary, we are desperate to find out where political influence lies and what people and institutions are important to listen to. Thus, we also desperately need a system to simplify the complex nature of politics, so that we can understand it. This is something games have done forever: to simplify a very complicated situation into a set of basic rules and mechanics that the human mind can

comprehend. In short, we feel the need to simplify politics and do so through gamification.

Gamification in politics: casual politicking

Gamification is "the use of game design elements in non-game contexts" (Deterding et al. 2011, 2), whereby a non-game context can be described as "elements that are characteristic to games – elements that are found in most (but not necessarily all) games, readily associated with games, and found to play a significant role in gameplay" (Deterding et al. 2011, 4). A non-game context constitutes any context that is not a game, where a game can be defined as "a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable" (Juul 2005, 35).

Politics, in Castells' sense of a global network society, is therefore a non-game context. On the smaller level of elections or debates, politics may very well be a game according to the description above. However, politics in the way I will discuss it is much more complex than that. Politics in the network society is not rule-based and formal, but performed by many participants in their own way. 'Outcomes', in so far as there are any, are not quantifiable: there might be different 'outcomes' of different debates on different media platforms concerning the same issue. This also means it is hard to assign value to these outcomes. Also, even though people do assign value to the outcome of a discussion and feel attached to it, this engagement is often quite limited. There are so many issues one can dive into that the consequences of any single discussion are restricted. The last part of Jesper Juul's definition described above does apply to politics, since everything is always

optional and negotiable. However, this alone is not enough to define politics as a game.

Politics cannot be as formal and simple as a game, precisely because of the complex nature of the network society. Yet we need the clear rules and well-defined boundaries of a game to be able to make sense of politics. Politics ultimately affects every single one of us and even the least politically engaged citizens need some way to figure out who holds the power to control parts of their lives. That is why contemporary politics is simplified into what Alex Gekker (2012) calls 'casual politicking'. He states that politics is conducted in a way that is very similar to the way Juul describes casual games. Gekker comes up with four similarities between casual games and politics (Gekker 2012, 35–36):

1. They are driven by intuitive ICT platforms, meaning everyone has easy access.
2. They are interruptible or issue-centered, meaning people can start and stop participating (for instance in issue networks) whenever they want to.
3. They are forgiving, meaning failing to succeed does not immediately have dire consequences.
4. They are socially-driven, meaning communication through (social) networks drives participation.

Gekker's term 'casual politics' could be translated into 'gamification of politics', since he describes how elements characteristic to casual games are implemented in the non-game context of politics. Gamification serves as a way to simplify politics by adding a more casual layer to it. An example of casual politicking would be using Twitter (an intuitive, socially-driven ICT platform) to post a tweet using a hashtag, which can be seen as an easy way to access an issue network around that hashtag. The cost of failing is diminished, because politics is perpetual: if an issue is settled in an

unsatisfactory way, there will soon enough be a new issue to dive into and step out of when desired.

So casual politics constitutes the gamification of politics. Yet even though this simplifies access to politics, it is only part of the solution to the overcomplicated network society. Casual politics is the system that allows for simplification; it lacks the fuel to actually make it happen. To fuel the system and keep it running, political polls do some hard work[4].

Casual polliticking

There are many kinds of political polls. Some centre on people's opinions on specific issues, others try to grasp larger topics like the public's opinion of the government. What I will focus on here is the kind of polls that determine how many seats a certain political party would have in parliament if elections were to occur at that specific time. Even though all types of political polls can function as fuel for gamification, this last category appears very frequently, is very familiar to many people and very popular in conversations about politics.

These polls are perfect as fuel for gamification primarily because they fit Gekker's model of casual polliticking so well. Polls are both entered and collected through intuitive ICT interfaces (see Figure 1) and their results can subsequently be distributed through other such portals like social media. This allows them to appear very frequently (usually on a weekly basis), since people's opinions are easily collected and immediately quantified. This quantification then means the results from these polls are expressed in numbers which people can understand very rapidly: one party has more prospected seats than another, so it is naturally more popular at the moment. This kind of concise information is very easy to distribute on social media, on which people favour short and

intuitive messages they can read within a few seconds.

Because the information polls provide is quantified and simple to comprehend, they also afford one to zoom in to specific issues. Like the tweet in Figure 2 illustrates, people can focus on one or a few parties' faring in the polls to comment on their stance on recent issues. Even if people don't explicitly name issues, they often pick only a few parties out of an entire poll to spread information about. In this way, polls allow people to communicate about their own political party, specific interests or issues.

The high frequency at which polls are released also makes them more forgiving towards the parties included in it. Polls are as perpetual as politics these days, not only appearing around election days but the whole year through. If a party does badly in one or a few polls, there might be other pollsters who rate it more favourably and in upcoming polls there will still be a chance to make a comeback. Polls can, however, create trends, which I will explain later. These significant trends ironically arise from the same perpetual polling practices that make individual polls seem less significant and therefore rather harmless.

Lastly, political polls are socially-driven. They provide people with something to share and talk about. This is mainly a result of polls' ability to easily migrate between platforms. Because of their inherent simplicity and quantified nature, polls can for instance be represented as single numbers ('party A has 10 seats'), as pie or bar charts to provide a graphical image of the situation or as a line graph to show temporal change. All of these methods easily fit in messages on social media, TV shows and newspapers and function as topics for conversations.

In conclusion, polls are very compatible with Gekker's model of casual politics. One
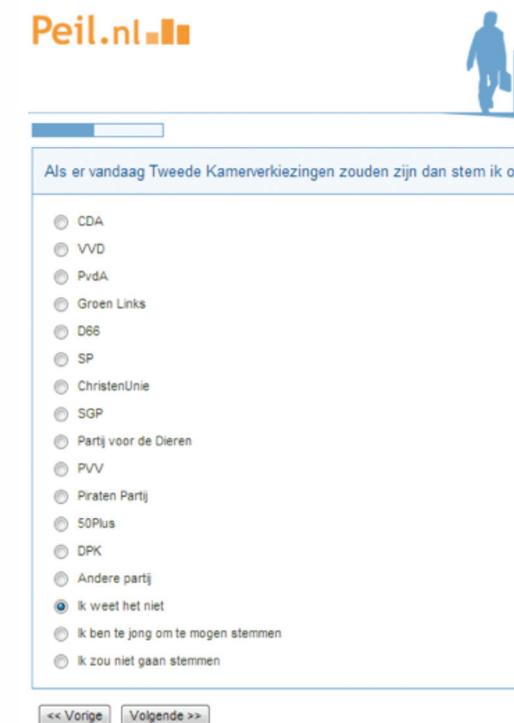
Figure 1: Example of an intuitive, easy way to pick your favourite party on http://www.peil.nl

Figure 2: Tweet illustrating the use of polls to comment on PvdA's (presumably bad) decisions on certain issues (budget cuts, buying Joint Strike Fighter planes and the drilling for shale gas).

could even argue at this point that polls are simply a particular example of the gamification (and thus casualness) of contemporary politics. However, polls have both a more profound and more dependent role than that. More profound, because they are more specific than gamification as a whole in affecting people's views upon politics. More dependent, because they could not perform that function without the system of gamification they run on. Polls in and of themselves don't do much; they are pollen which thrive in their context. I will now focus on the question how and why exactly they have such an impact on our vision of politics.

Polls as bandwagon wheels

Countless empirical studies have tried to measure the effect of polls on political preference. The most persistently tested theory in this regard is that of the 'bandwagon effect': the idea that people like to side with the majority (Marsh 1984; Morwitz and Pluzinski 1996; Van der Meer and Hakhverdian 2012). The effect one isolated poll has on public opinion seems to be negligible, but polls that are accompanied by a message explaining what the poll means will generally cause people to slightly favour the 'winning' party more (Van der Meer and Hakhverdian 2012). This can be explained by cognitive dissonance theory (Morwitz and Pluzinski 1996), which states that people want to align their behaviour with their expectations. This means most people want the party they prefer to also be preferred by others. If that is not the case, and they are not bound strictly to that one party to begin with, they may decide to switch sides upon knowing what the polls have to say.

The bandwagon effect is a psychological theory focusing mainly on empirical research of specific cases. This is not the kind of research I am doing here, nor am I interested in quantified

results of what percentage of people would actually vote for another party after being presented with a poll. In that way, the bandwagon effect has been identified in singular experiments. However, I argue that the influence of polls increases exponentially when more and more polls in a row tell the same story. Individual polls might be able to communicate an event ('party A is still ahead of party B'), but polls in rapid succession truly excel at communicating a *trend* ('party B is catching up on party A').

Poll as trend media

Because of this quality, polls can be described as 'trend media' in the same way that Brian Massumi (2005) calls the TV the 'event medium'. Television, Massumi states, excels at the "spontaneous mass coordination of affect" (Massumi 2005, 2). This massive, centralised character is not present in internet-based media content. Television's broadcasting origins are far better at claiming attention, stating the urgency of an event and shaping people's sense of community (Gripsrud 2004, 213). Massumi relates this quality to the use of the Homeland Security Advisory System in the United States, whose 'terror alert level' was frequently broadcast on TV.

Quick-paced, easy-to-access social media do not coordinate the affect of an event, but instead spread the idea that a trend is happening. This is due to their decentralised nature and their design principles, which focus on letting users join in on such a trend. The decentralised many-to-many communication on social media makes any centralised mass coordination impossible, since the many directions a discussion can take are always decided through an interplay of top-down and bottom-up initiatives. People generally pick up on what mass media communicate and then give

that message their own twist on social media, mainly on Twitter (Kwak et al. 2010).

This does not mean that no consensus can be reached on a certain topic. On the contrary, even though social media users have the theoretical ability to pick up on anything they read, hear or see in the news, they usually don't. Instead, dominant trends form that exponentially gain attention at first and then gradually die out again (Asur et al. 2011). These are institutionalised by Twitter into 'trending topics', but stories shared across Facebook news feeds, 'viral videos' on YouTube and recommended photographs on Flickr work in the same way. They are topics that reach a large number of people and thereby gain importance. Political polls often become trends in this way. More specifically, parts of those polls are turned into trends according to related popular topics at the time. The emergence of a progressive trend like this is reminiscent of the interactive way a narrative progression is constructed in many games, once again reminding us of the gamification inherent in politics.

Polls as pollen

Arguably, polls have had that effect for the last 200 years. However, the way polls are now dependent on gamified processes of communication is very different from the situation only ten to twenty years ago. As stated before, polls have been integrated seamlessly with casual politicking and in the way they are used today, they are entirely dependent on it. They are the fuel that flows through the otherwise empty pipes of the gamified machine. More accurately, polls are the pollen transported from a polliniser (the source of the pollen) via a pollinator (the transporter of the pollen) to another entity, which itself becomes a polliniser as well.

The gamification of politics, then, is not exactly one big machine with a unidirectional flow of fuel that drives it. It is a system of pollination, in which polls stem from different sources and migrate from platform to platform, from individual to individual. This is how they create influential trends, in a networked fashion suitable to the network society. What this trend will be and what its consequences are obviously differs from time to time, but the psychological theory of the bandwagon effect can give us a clue in many cases. The upcoming example will exemplify such a case: the Dutch general elections of 2012.

The case: turning tables

I already explained the peculiarity of the Dutch general elections of 2012 in the introduction to this paper. According to the polls, the tables turned drastically in the few weeks before the elections. The leading role of SP, once a very dominant party according to pollsters, was very rapidly stolen by PvdA. Figure 3 to 5 below are graphical representations of the polls taken during the five weeks before the general elections by three major pollsters: Peil.nl, TNS NIPO and Ipsos Synovate[5].

There are differences between the results of the different pollsters, but the overall trend is clear in every one of these figures: SP drops in seat count, whereas PvdA rises. In this short case study, I will present an overview of how polls were used and distributed in the time frame of five weeks before the elections. For time's sake, I will only focus on tweets about the polls during this period. Twitter is well-known for being used to disseminate the kind of political information polls provide and certainly complies to Gekker's model of casual politicking.

During the time from the 14th of August to the 12th of September of 2012, a total of
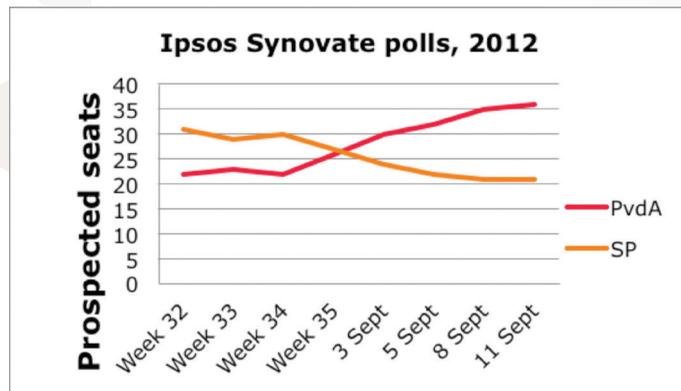
Figure 3: Polls taken by Peil.nl. X-axis: date of the poll in weeks/days. Y-axis: results of the poll expressed in prospected seats in parliament.
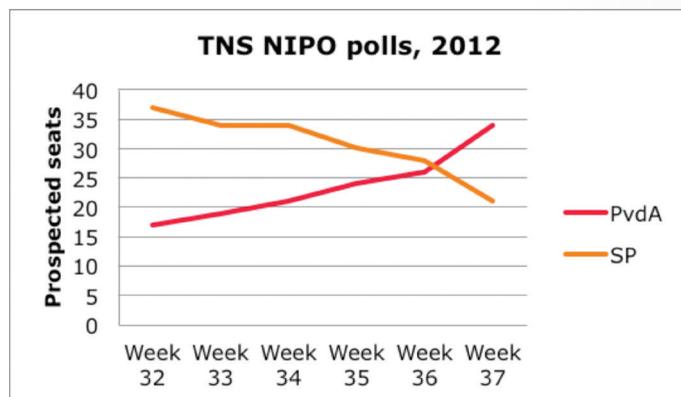

Figure 4: Polls taken by TNS NIPO. X-axis: date of the poll in weeks. Y-axis: results of the poll expressed in prospected seats in parliament.
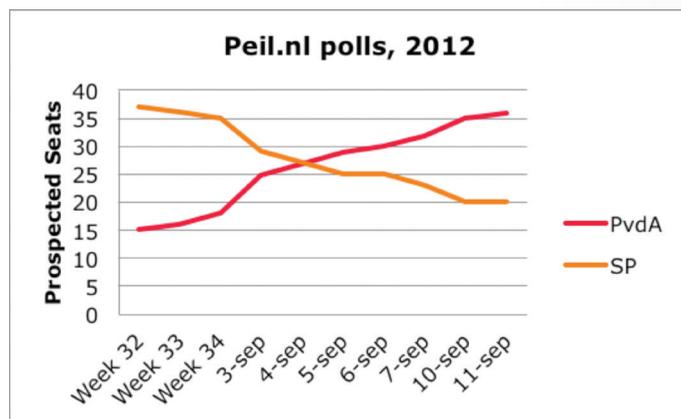

Figure 5: Polls taken by Ipsos Synovate (called 'Politieke Barometer'). X-axis: date of the poll in weeks/days. Y-axis: results of the poll expressed in prospected seats in parliament.

25,838 public tweets were sent that contained the word 'peiling' (Dutch for 'poll') or a variation of that word (plural or with a suffix). I downloaded these using Coosto, a social media monitoring tool which has firehose access to Twitter, meaning it has access to all public tweets[6]. It was necessary to keep the search query very open, since many people did not use a clear hashtag when tweeting about the general election polls. However, since I will only consider tweets relating to specific political parties as well as the keyword 'poll', many irrelevant tweets were automatically filtered out while using Microsoft Excel to measure statistics in the dataset. These statistics will form the starting point to look for interesting moments in the studied time period. These moments will then be further explored by taking a qualitative look at a few of the actual tweets.

Pollination in advance of the 2012 elections

For every day in the 30 day period I included in my dataset, I determined how many tweets mentioned any of the parties participating in the elections or their leaders. The formula I used on every tweet looks like this:

'=IF(COUNTIF(I2;"* sp *") + COUNTIF (I2;"*#sp*") + COUNTIF (I2;"*roemer*") >= 1;1;0)', where 'I2' is the row of the tweet in Excel, every instance of 'sp' is the political party and 'roemer' is the party leader[7]. This results in '1' if any of the keywords were mentioned, and in '0' if not. Adding up the 1's for an entire day results in the amount of tweets that mention both the keyword 'poll' and a specific party on that day. Lastly, these sums were turned into percentages of the total amount of tweets sent that day. This results in the graph of Figure 6, where the four most frequently mentioned parties are included.
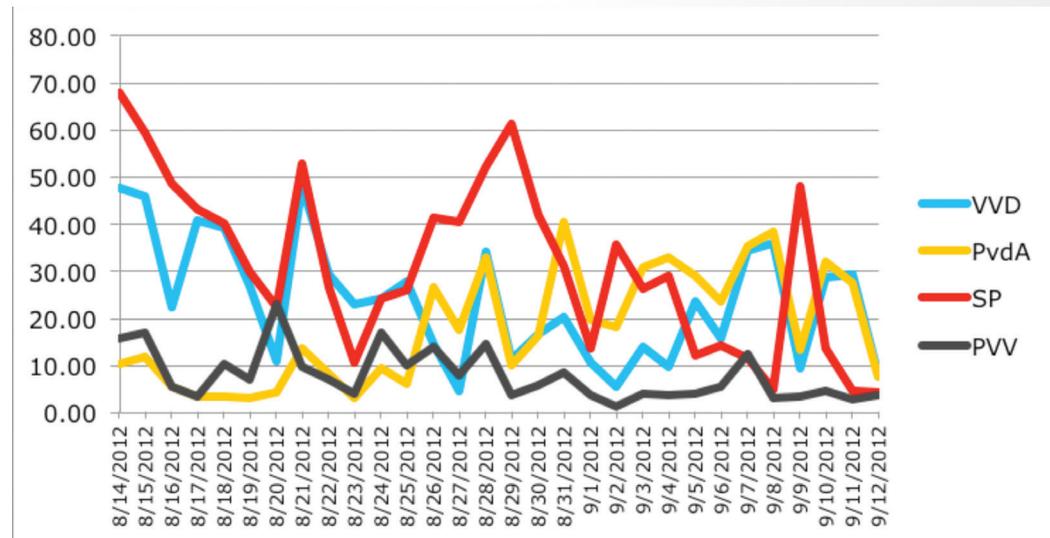
Figure 6: Percentages of poll-related tweets mentioning a party or its leader per day. X-axis: date. Y-axis: percentage.

This graph serves to demonstrate the overall mentions of each party in the period before the elections, which denotes how important they were thought to be in relation to the polls. Of course, many of the peaks in the graph represent days on which polls were released. A notable exception is the sudden rise in the mention of SP leader Roemer on September 9th 2012. Fittingly, those tweets mainly concern the fact that Roemer wanted to ban polls right before the elections, not about poll results themselves. We can certainly understand why he would want to ban polls, looking back at Figure 3 to 5.

However, this peak does not relate directly to results of polls, which is what we are looking for. So if we disregard it, we can see a rough trend for three of the four parties: SP starts off with a high percentage of mentions and ends up with far less, mentions of VVD decrease at first but climb again near the elections and PvdA stays relatively stable until the 25th of August, after which it

climbs steadily. The line for PVV stays relatively low and stable. Considering PVV was the fourth most frequently mentioned party, this exemplifies the disproportionate prominence the other three parties had in communication about polls.

Yet it is more interesting to look at tweets which mentioned more than one of the three prominent parties. Figure 7 shows the same information as Figure 6, only for tweets that included at least two of the parties. We can see a clear tipping point on the 28th of August. Before that, polls released on the 14th (TNS NIPO), 17th (Ipsos Synovate) and 21st of August (TNS NIPO) clearly result in lots of tweets about VVD and SP. An exception is the poll released on the 26th of August (Peil.nl), which claimed a slight improvement for PvdA and a minor drop for SP, resulting in tweets about those parties. This is up to week 34 in Figure 3 to 5, when SP was still doing very well in the polls. Then, on the 28th of August (week 35 in Figure 3 to 5), a poll released by TNS NIPO suggests

Figure 7: Percentages of poll-related tweets mentioning a combination of at least two parties or their leaders per day. X-axis: date. Y-axis: percentage.

KEVIN WILLEMSEN **POLLINATION OF POLITICS**

KEVIN WILLEMSEN **POLLINATION OF POLITICS**
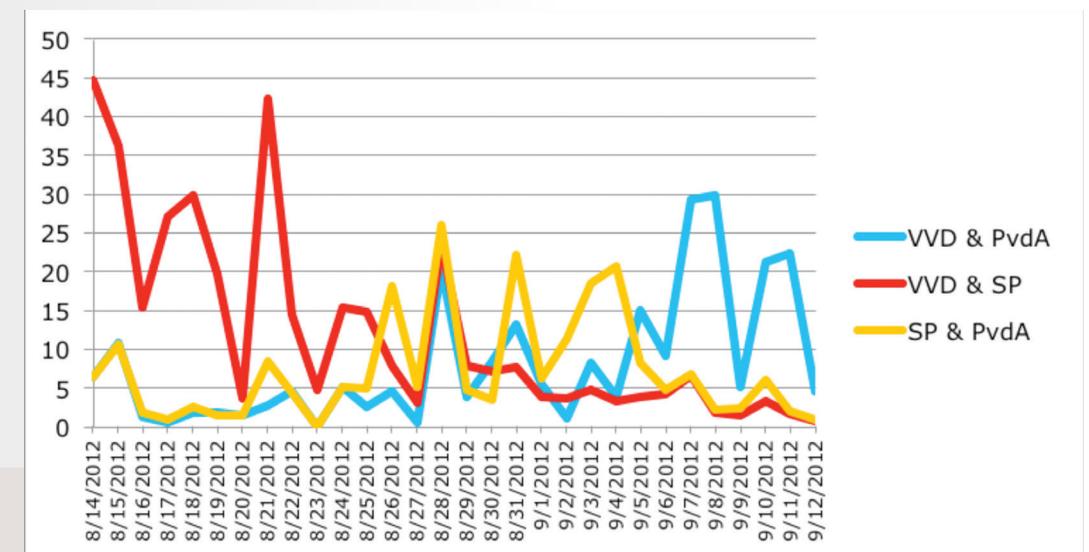
that SP dropped 4 seats and PvdA gained 3. This is just after a prominent debate was broadcast on television and the polls are widely said to represent Samsom's (PvdA) good, and Roemer's (SP) terrible performance in that debate. VVD is also still mentioned often together with the other two parties, probably because it got further ahead of SP and was then clearly the polls' favourite.

So we can see how polls are immediately used after such a debate to get a grip on what consequences it has. Figures 8 and 9 are two examples of the tweets about poll results. The tweet in Figure 8 focuses purely on the 'loss' of SP (Roemer) versus the 'win' of PvdA (Samsom), neglecting all other parts of the poll. This is an example of the issue-centeredness of casual politicking and how polls facilitate it. The tweet in Figure 9 informs about all parties, but still states the debate had a demonstrable effect. This tweet was significant, since it was retweeted 60 times, reaching lots of Twitter users. Its sender can therefore be called an important polliniser and it demonstrates well how the pollination of politics works. Tim de Beer, the author of the tweet, cannot force people to transport his poll(en) elsewhere. Instead, like a plant, all he can do is attract people as much as possible and hope they spread his message. He does so by presenting concise but detailed information and an added juicy message that the debate had a clear influence on the poll. Furthermore, he has an authoritative position as a major person working at a polling company: he is a particularly tall flower in a competitive field.

The people retweeting Tim de Beer are at the same time pollinisers and pollinators, which is where the pollination of politics deviates from the biological model of pollination which has worked as a metaphor so far. As soon as people retweet, the tweet with the poll immediately shows up on the home screen of those people who follow them on Twitter. In the pollination of politics,

Figure 8: Tweet concerning a poll of August 28, stating the debate had a big influence ('grote invloed') on the polls.
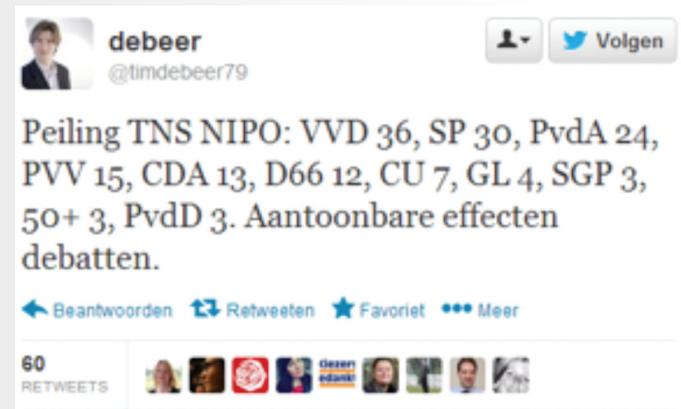
Figure 9: Tweet by a political researcher at TNS NIPO, stating the debate had demonstrable ('aantoonbare') effects.

Figure 10: Tweet about PvdA gaining on SP and VVD according to a TNS NIPO poll.

Figure 11: Tweet about a 'battle on the left' ('strijd op links'), according to an average of different polls called 'Peilingwijzer'.

there is no distinction between transport and active pollination of other people's Twitter home screens. Of course, this only strengthens the dissemination of the poll to more and more people, giving them the idea that these results are important. This sense of importance then grew into a trend.

After the critical moment on August 28, Figure 7 mainly shows us a greater percentage of tweets devoted to the sudden battle between SP and PvdA until the 4th of September. A final peak in the coverage on this battle is visible on that last day, of which I will give two examples. Many of the tweets on September 4 are like Figure 10 and 11, focusing on a battle between two or sometimes three parties (VVD included). This battle was born from the trend the polls have built up until that point. According to polls published on or right before September 4, SP was still ahead of PvdA (TNS NIPO; Figure 4 week 36), on par with PvdA (Peil.nl; Figure 3), or slightly behind PvdA (Ipsos Synovate; Figure 5). Considering only that particular moment, this certainly does not have to mean there is a battle going on. But since polls are trend media, people don't see polls as simply a snapshot of political circumstances, but as being a progression from the previous poll and into the next. As stated before, this is a product of gamification. Since people are able to see the polls as progressive 'checkpoints' (in game language) en route to an ultimate goal (the elections), they implicitly compare a poll to previous polls. Because of that, polls created a fierce battle between two parties where none had to inevitably exist.

This battle was as fierce as it was short-lived, judging by Figure 7. By September 7, tweets about a new battle between VVD and PvdA dominated, closing off the battle between SP and PvdA of which the latter had been proclaimed the winner. It is conceivable that the polls had created a bandwagon effect during the battle, one that made left-wing oriented people opt for the safety of the presumably larger of these two major left-wing parties. From that point until the elections, PvdA and VVD were said to be engaged in a head-to-head, leaving SP far behind them. In the end, the result of the elections on September 12 were that VVD got 41 seats, Pvda 38 and SP only 15.

Conclusion

I have argued that politics in the network society we live in is ultimately too difficult to understand satisfactorily without gamification, which comes in the form of casual politicking. Casual politicking, however, is a system of pollination which needs polls to migrate through it. Polls, in turn, have flawlessly adapted to casual politicking: they easily migrate between platforms and people, who can disseminate those parts of a poll they wish and thereby become pollinisers themselves. If several polls in a row show a party either gaining or losing prospected seats, people will very quickly believe that a trend is going on. Polls thereby mediate trends more so than events, and can be called trend media. I hope to have illustrated this point in my case study, in which it became clear that communication about polls is to a large degree structured by the results of successive polls themselves.

Some reservations are in order though. I cannot hope that my limited and biased case study, which served as an illustration of my point instead of evidence for it, proves all of the theories I have linked to political polls. Due to limitations pertaining to time and space I have only analysed tweets that were about polls in the first place, ignoring many politically oriented tweets about other topics. Therefore, it is impossible to say if and how these trends in the communication

about polls were also present in non-poll related tweets. Besides that, there is of course a clear problem with only studying tweets. Polls certainly not only exist on Twitter and it could be interesting to see how they are dealt with in different media.

I also dare not say definitively if polls are exclusively responsible for creating the trend in advance of the 2012 elections. It could be, for instance, that a few debates in a row went very well for Samsom and poorly for Roemer. Still, it is hard to believe that a few subsequent debates on their own could have such a big influence on people's sentiment towards parties. It is exactly the strength of polls that they can immediately be related to an event like a debate, turning that event into a possible trend. This interplay between polls and other channels of political communication would be very interesting to study much more thoroughly. Also, the role of polls in different parliamentary systems than the Dutch should be given attention, since they might exert their influence in a different way.

In conclusion, political polls are, at the very least theoretically, about much more than (mis)representing public opinion or even manipulating it. They are about creating trends by migrating across a system of gamification, whereby they rapidly pollinate different media platforms. Polls can so logically be tied into great theories like those of the network society and gamification that they deserve to be studied more from a media studies perspective. I hope to have been an adequate polliniser to kick-start the fertilisation of such studies in the future.

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Notes

[1] For information on these elections, see the Wiki on it: http://nl.wikipedia.org/wiki/Tweede_Kamerverkiezingen_2012

[2] There are different companies providing regular polls and there is no consensus between them. The most extreme case states SP lost 17 seats in this period, whereas in the least extreme case they lost 11.

[3] The communications consultancy office I work for performs very regular analyses of online debates for governmental agencies. So even in times of crisis, governments know they cannot stick exclusively to traditional mass communication channels to exert influence.

[4] I will use the analogy of 'fuel' for now, for the sake of clarity. However, in the section about polls as pollen I will explain why the analogy of pollination is more accurate.

5 The figures have different and somewhat unusual intervals on their x-axes to represent all polls taken in this period by the respective pollsters, which were also sometimes taken with irregular intervals.

[6] See http://www.coosto.com/.

[7] I looked for both ' sp ' with spaces around it and '#sp', because telling Excel to look simply for 'sp' in a tweet also gives a positive result for any word that contains there two letters, of which there are a lot in Dutch. Therefore, I decided to look for ' SP ' with spaces around it, to make sure it only came up with tweets that are about the party, missing potential tweets about that party where no spaces were used. Adding '#sp' means that at least the popular Twitter function of the hashtag is taken into account. For good measure, I did the same for all the other parties. Therefore, there were probably slightly more tweets about every party than I will mention. However, the differences between the parties are what counts, which is still accurate.

YOU PASSED LEVEL 6
GO TO THE NEXT LEVEL
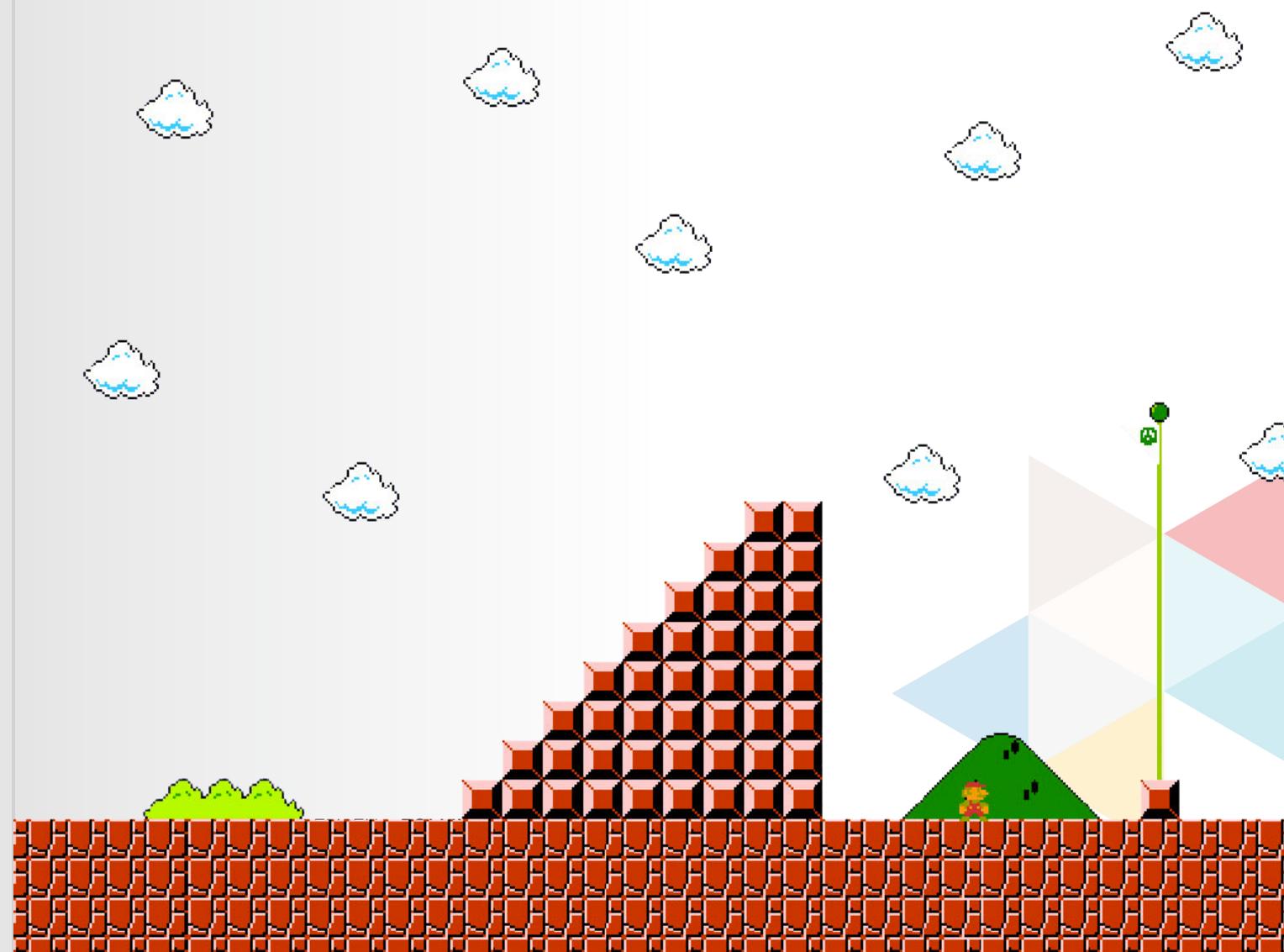
LEVEL 7

BEN BORROW

GAMIFICATION:
TIME TO GO WITH THE FLOW?.

ABSTRACT - Gamification is still a relatively contemporary movement in the sphere of new media. However, no sooner has the movement been lauded as innovative, that ciritics have labelled it thinly veiled exploitation. What has lead critics to such a conclusion and how might designers seek to implement more effective Gamification applications? The answer lies in the so far unapplied psychological phenomenon of flow - whereby an optimal point of equilibrium between the player's perceived skill and challange of the activity is desirable. The fitness application Nike+ serves as a powerful case study

Introduction

The word 'Gamification' was "first documented in 2008, but the term did not see widespread adoption before the second half of 2010" (Deterding et. al. 2011, 9). It is curious then, that within months of enjoying "widespread adoption," Gamification's name had already been sullied and acclaimed game scholars were labelling it both "bullshit" (Bogost 2011) and "missing the point entirely" (McGonigal 2011). Despite the naysayers though, Gamification remains a powerful marketing tool that both small start-ups and multinationals are eager to employ as a means to corporate advantage. Nevertheless, the question remains: why is there such dissonance between Gamification's critics and the marketers eager to 'Gamify'? And can such discord be reconciled?

This paper will explore the divergent opinions concerning the efficacy of marketers' implementation of Gamification. Divided into three sections, the text will firstly address the general concept of Gamification (with corollary discussions addressing definitions, mechanics, and examples of widely-considered Gamification success stories). The text will secondly address the criticisms levelled at the concept; and as a third and final section to the text, I will proffer Mihaly Csikszentmihalyi's psychological concept of Flow as a potential antidote to some of Gamification's perceived pitfalls – thereby reconciling the aspirations of Gamification marketers and the commonly encountered weaknesses of Gamification marketing. Throughout the paper, an eclectic range of theoretical and technical sources are relied upon, thereby rendering the text's approach standard qualitative.

A Conceptual Exploration of Gamification

Varying Definitions

Before any meaningful analysis of Gamification's virtues and pitfalls can begin, it is first imperative to arrive at a general definition of the concept to serve as a constant or baseline for discussion. However, as noted by Schrape, the term Gamification has not yet elicited a unanimous definition among academics and indeed "several definitions exist" (2013, 4).[1] Nevertheless, both Schrape and Deterding each arrive at remarkably similar conclusions. Schrape argues "in the broadest sense scholars agree: Gamification describes the permeation of non-game contexts with game elements"(2013, 4), while Deterding et al authoritatively claim, "based on our research, we propose a definition for "Gamification" as the *use of game design elements in non-game contexts*" (2011, 9). Interestingly though, only a year before pronouncing this definition, the widely-referenced scholar Gamification scholar Sebastian Deterding made a speech in which he relied upon Bunchball Inc. (the 'market leader in Gamification (Broughton 2011) for a rather commercially-inflected assessment of the concept: "integrating game dynamics into your site, service, community, content or campaign, in order to drive participation" (Deterding 2010). Moreover, Zichermann and Cunningham employ a likewise marketing tone in their definition: "Gamification is the process of game-thinking and game mechanics to engage users" (2011, 3). [2]

One signification commonality between the aforementioned definitions is the implementation of "game elements in non-game contexts," and so our eyes must turn to the meaning of games. According to Zichermann and Cunningham, "game design is a relatively

new, unaccredited discipline with roots in both psychology and systems-thinking" (ibid, 35). The modernity of the concept though, has not precluded Zichermann from elucidating his game model, which he describes as "a system in which players engage in an artificial conflict, defined by rules, that result in a quantifiable outcome" (Zichermann & Linder 2010, 21). Many others have attempted to grasp the concept of games, too. [3][4][5][6][7] However, for the sake of this text, Juul's definition of games is preferable because it assimilates the elements proposed in other influential definitions in order to provide a cogently rounded and supported summation of the concept (Juul, 2003, 36). Juul proclaims:

> A game is a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable
>
> (Juul, 2003, 37).

For the purposes of a Gamification-centred discourse, Juul's definition provides an insight into what Deterding et al and others are concerned with when referring to "game elements." It also enables a clear juxtaposition against the concept of 'play'. [8] As a consequence, Deterding et al argue that Gamification "demarcates a distinct but previously unspecified group of phenomena, namely the complex of gamefulness, gameful interaction, and gameful design, which are different from more established concepts of playfulness, playful interaction, or design for playfulness"(ibid). [9]

Gamification Mechanics

Assuming Deterding et al and Schrape's general definition of Gamification, and with consideration to Juul's concept of games as distinct from play, the mechanics that constitute Gamification become pertinent. Poignantly, we can again look to Deterding for an assessment of how most Gamification is evinced:

> Despite the seeming variety [of Gamification vendors], most vendors and gamified applications still share the blueprint defined by Foursquare: there's an activity you want your users to do (like checking in). You give them points for performing the activity. For a certain amount of points or certain activities, they earn extras – badges, levels -, and you throw in a leaderboard to create competition
>
> (Deterding 2010).

Some theorists somewhat reductively associate Gamification almost exclusively with Badges, Levels, Leaderboards, and Points (McGonigal 2011) (Chorney 2012, 12). However, these "gameful" or "game design" aspects of Gamification are merely commonly associated indexes of the notion behind Gamification. As Deterding et al suggest:

> since games are designed with the primary purpose of entertainment, and since they can demonstrably motivate users to engage with them with unparalleled intensity and duration, game elements [including, but not limited to badges, levels, etc.] should be able to make

other non-game products and services more enjoyable and engaging as well

(2011, 10).

To take a more literal approach though, how might one consciously Gamify an activity? With an eye to Deterding et al's definition, ostensibly most activities have the potential to be Gamified. Indeed, if Gamification is merely the process of implementing game elements in non-game contexts, an astute observer should recognise classroom-awarded stars for good work as Gamification, likewise, leaderboards at factory plants highlighting the most productive worker. Nelson raises this notion arguing aside from the modern manifestations of Gamification, the concept has two notable precursors in the 20th Century in what are otherwise dichotomously arranged economic structures: the American Capitalist model and the Soviet Communist one (2012). Nelson speaks rather vaguely about a movement in American management techniques of the late 20th Century whereby "concepts of the sandbox [i.e. games and fun] were encouraged in the workplace" (ibid). While he speaks generally about the American concern to "have fun with work," Nelson precisely details how the Soviets employed Gamification mechanics to reconceptualise the incentive to work. For example, low-paid workers were encouraged to work in teams, with each team competing against another to complete a given section of a construction site more quickly; or, in the case of bridges, the construction would be divided into two groups, and each would be encouraged to complete their side of their bridge first (ibid). While such initiatives can be neatly applied to a Gamification framework, Gamification was only recently coined as a concept as a consequence of the rise of new media marketing techniques and the late 20th/early21st

Century movement to a rather technical study of games and play that Deterding et al identify as "*funology* – the science of enjoyable technology" (2010, 10).

Influential Implementation of Gamification Mechanics

Likely as a consequence of successfully achieving the Gamfication's aforementioned prerogatives and by "deploying some of the basic tenets of the discipline…points, badges, levels, challenges and rewards," DevHub claims it has differentiated itself as a market leader (Zichermann and Cunningham 2011, 16). The rhetoric continues: "DevHub has raised various engagement metrics such as time on site by as much as 20% over pre-gamified levels" (ibid). Similarly, Bunchball claims clients of its Nitro Solution have enjoyed "page views double, pages per visit increase 60%, unique visitors increase 30%, time on site increase 100% and a doubling in repeat monthly visits – with a payback time of as little as 3 months" (Broughton 2011). However impressive such claims are though, they provide little insight into how Gamification might work. A more fruitful exercise then, would be a close organisation-by-organisation inspection of Gamification in action.

Indeed, any erstwhile Gamification discussion would be remiss to omit a specific analysis of Foursquare's game mechanics (Deterding et. al. 2011; Cook 2010). Foursquare's legacy Gamification legacy is so indelible that Gamification like Zichermann claim "it is easy to forget Foursquare did not invent badges,"(2011, 50) [10] and today it seems Foursquare might have a justified claim to 'Badge King' – provided 'Badge King' is not one of the numerous and varied titles players can earn through using the application. Indeed, the concept (as designed by two ex-Google software designers) disseminates quirky badges to users who check in and review localities

around the world. The badges are designed to both denote achievement, and "demarcate levels [between users] en lieu of a separate levelling system" (ibid). This appeals to the player's desire for recognition and status over others. Zichermann also opines the method's efficacy is at least to do with the seeming randomness at which Foursquare doles out the badges, so players usually do not know what badge will come next. He notes "while the lack of specific goals might frustrate a more competitive player…its strength is in actualising pleasant surprises by catching its players off guard with badges" (ibid). Foursquare represents an innovative Gamification mechanic that satisfies some of the intrinsic player motivations (as discussed later), and keeps the concept 'fresh'. [11]

Other pertinent Gamification examples can be seen in Game apps themselves. [12] For example, Doodle Jump, a popular iPhone game, enables players to view the leaderboard according to not simply their previous scores, but also local (i.e. ranking of players within spatial confines), social (i.e. ranking of players against their friends) and global leaderboards. This device is designed to inspire competitiveness amongst players, who, although might not set world records, can at least compete within a talent pool including only their friends or other players around them. Similarly, Yelp's mobile app (that ranks people according to their weekly check-ins) draws upon a similar design, and refreshes the leaderboard to ensure competition (and so-called 'stickiness') remains fresh.

As a periphery to leaderboard mechanics, player progress within a gamified application is also designed to encourage engagement. For example, linkedin.com displays a progress bar for measuring progress in filling in personal details (thereby attempting to incite individuals to continue revisiting the site to rework their profile). However, Zichermann argues that linkedin's

progress bar is somewhat inept because progress is too linear, and one can achieve 100% completion (2011, 47). He proffers, Angry Birds (another popular iPhone game) as a better example of gamified progress because the levels do not proceed in an linear fashion from least to most difficult; instead, in the first 20 levels or so, "the player progresses almost seamlessly, gaining confidence and experience. However, at one of the higher levels – level 21 for example, the player encounters a decidedly more complicated sequence of challenges than the one before it" (ibid, 45). Consequently, the player is inspired by the unprecedented challenge of a considerably more difficult level and 'stickiness' spikes (ibid).

Criticisms of Gamification

Thus, having explored the concept behind Gamification, and by necessity, some of the fundamental its mechanics, a concise appraisal of Gamification's criticisms may begin in earnest. I address three general areas of such criticism: the perceived marketing 'hijacking' of the concept, issues of content within Gamification, and finally, issues of design and implementation.

Gamification: Hijacked and Sullied in the name of Marketing?

Ian Bogost, a high profile game designer and Gamification critic dismisses the movement as "marketing bullshit" (Bogost 2011). Others too, including Gamification proponents label the concept "another corporate buzzword" (Chorney 2012, 24), or more hyperbolically, the "marketing buzzword of our time" (Zichermann and Cunningham 2011, 4). While "buzzword" might in and of itself be an ostensibly neutral term, critics such as Bogost and Chorney infer grave problems

with marketers adulterating the game concept for corporate advantage. Indeed, both just as readily employ the word "exploitation" as they do "buzzword" (Bogost 2011; Chorney 2012). Bogost goes as far as to suggest relabelling the movement "Exploitationware," while Chorney posits a similar idea, explaining, "video games have recently broken into the mainstream in such a way that players have reached a critical mass that marketers want to exploit" (2012, 26). Similarly, he notes the implementation of game elements in non-game contexts is nothing new, which begs the question why is there such a push for Gamification now? Chorney claims the answer lies in the fact "marketers need to jump on the hype that has grown around video games, an area which until recently had been a niche market" (ibid).

Nevertheless, the association of Gamification with exploitation requires further critique. What is so wrong with the growth of the Gamification field if it is a successful marketing tool? Here, it seems the arguments presented by Chorney and Bogost are at their weakest. Bogost suggests "the very point of Gamification is to make the sale as easy as possible" (2011), meanwhile, Chorney states that "making a good game is not easy, or else everyone would do it…to take content and build Gamification techniques around it is easy" (2012, 28). Yet while both critics dismiss the concept for being a simple, the best justification for their disdain of such simplicity seems to be a deep-seated resentment that the technique is an effective money-spinner. Indeed, with an unjustified broad stroke, Chorney states, "the goal of Gamification is to make money" (ibid). Bogost too, appeals for "leadership," which he defines as "anything greater than an affirmation of existing corporate practices" (2011).

Issues of Unsatisfactory Content within Gamification

A more compelling argument against Gamification than marketing exploitation, is that many Gamification examples are either unengaging for their lack of content, or require their players to surrender personal details in order to access content. [13] Aside from its value as a marketing tool, Gamification has engendered a sacrifice of "valuable content for rhetoric and advertising" (Chorney 2012, 26), which Chorney claims is "valueless content" (ibid, 19). Furthermore, although Gamification designers "attempt to ride the coat tails" of the proliferation of video games (ibid), they seem to ignore the value of engaging content as a driving force behind video gamers' motivations. Similarly, Deterding claims Gamification designers are ignoring ideas of play (Deterding 2010). Indeed, Gamers do not play video games for their leaderboards, they play for the narrative, content and 'play' (ibid).

Gamification's failure to appeal to player motivation

Zichermann & Cunningham claim "the mechanics of a gamified system are made up of a series of tools that, when used correctly, promise to yield a meaningful response from the players" (2011, 36). To understand such tools though, scholars argue for a need to understand player motivation to begin with (Robertson 2010; Houtari and Hamari 2011). According to Zichermann & Cunningham, a person's motivation for engaging in a particular activity (be it a Gamified experience or not) comes down to the acronym SAPS, "status, access, power and stuff," and "conveniently lists each potential prize in order from the most to the least desired, the most sticky to the least sticky, and the cheapest to the most expensive" (2010, 10). Thus, any badge, point or

leaderboard Gamification mechanic should appeal to such motivations. For example, "Badges are known as a status item. Levels and leaderboards are another way to indicate that a player has more or less status or achievement in a given game…" (Zichermann and Cunningham 2011, 21).

However, "people today think of Gamification as simply the corn flakes you can just add to any interface, application or service to get a kick, to make it more fun, motivating or engaging" (Deterding 2010). And herein lies the crutch in most Gamification design: the notion that simply implementing "game elements" can render an activity fun. While Zichermann & Cunningham might speak of motivation as "status, access, power and stuff," others recognise a need to elicit a player's intrinsic rather than extrinsic motivation (McGonigal 2011; (Deterding 2010; Robertson 2010). McGonigal argues:

> Gamification is really concerned with extrinsic rewards. We try to reach for them because they improve our status, but not because we want them in and of themselves. Intrinsic rewards…we do because we love them
>
> (2011).

Similarly, Chorney states, "I enjoy video games because I beat the boss monster, not because beating the boss monster gives me 10,000 points" (2010). So while Gamified applications may appeal to a player's extrinsic desire for points (or as Zichermann might put it, "status"), video games appeal to more innate, intrinsic desires such as a sense of adventure and enjoyment of the journey itself. Video games may be fun because they provide "experiences of competence, self-efficacy and

mastery," but as Koster claims "not a single empirical study to my knowledge mentions extrinsic rewards as a crucial motivating factor" (2011, 18).

The antidote: Flow

Although Zichermann & Cunningham acknowledge that "at the heart of success of games is an idea called *flow*" They, nor any other scholar, have extensively applied the concept to Gamification. I propose then, that Gamification's aforementioned ineptitude to successfully engage and motivate players can be overcome through design geared towards flow.

The Concept of Flow

As early as 1956, Koch defined a state (B state) where a person is fully absorbed in a task, has no other need, is elated, energised, and does not feel fatigue (Moneta and Csikszentmihalyi 1996). A few decades later, Mihaly Csikszentmihalyi extrapolated idea of a B state and coined the term flow – a psychological phenomenon defined as an optimal, extremely enjoyable experience when an individual engages in an activity with total involvement, concentration and enjoyment, and experiences an intrinsic interest and the sense of time distortion during his/her enagement (Csikszentmihalyi 1975; Chen, Wigand, and Nilan 2000). According to Moneta & Csikszentmihalyi, this state is contingent upon tow subjective variables: "(a) the perceived challenges (or intrinsic demands) or an activity; and (b) the perceived skills (or self perceived capacity to meet demans)" (1996, 277). The theory postulates that flow is the middle ground between the two dynamics:

(a) if the perceived skills are less than the perceived challenges in a given task, then a person experiences anxiety and will try to balance by learning new skills; and (b) if the perceived skills are greater than the perceived challenges, then a person experiences boredom and will try to balance by seeking more challenging activities"

<div align="right">(ibid).</div>

Thus, between channels of boredom and anxiety, people will experience flow (refer to figure 1). Moreover, in order to duplicate the experience of exhileration that flow brings "an individual must slightly increase the challenge level and also develop his/her skill level to meet the increased

Figure 1: This diagram represents the dynamic Flow Channel, whereby an individual's perceived skills are in concert with the perceived challenge. (Csikszentmihalyi, The flow experience and its significance for human psychology, 1988)
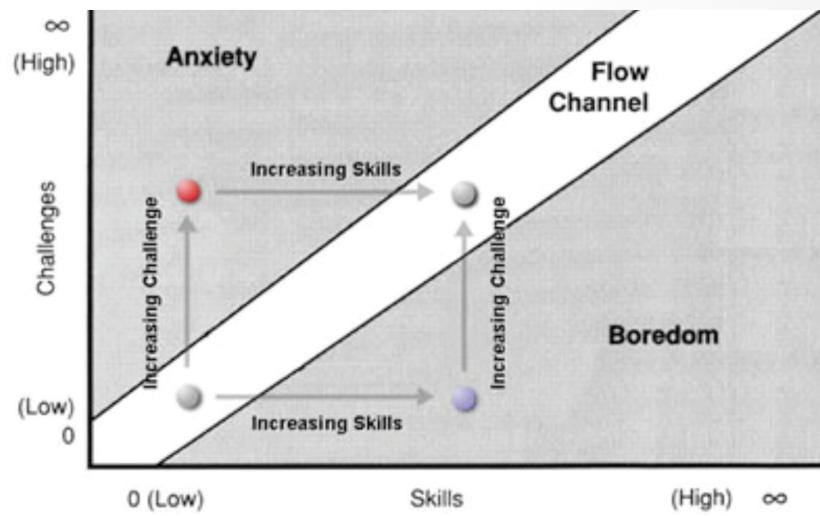
challenges" (Chen, Wigand, and Nilan 2000, 264).

Moreover, "the concept of flow has been extensively applied in studies of a broad range of contexts, such as sports, shopping, rock climbing, dancing, gaming and others" (Hsu and Lu 2004, 856). Interestingly though, the concept has never been applied to Gamification, however, research conducted with respect to internet usage and games provide somewhat of a intersection and synthesis, from which conclusions about flow with respect to Gamification might be drawn.

Flow in Internet Usage

Several authors have suggested the concept of flow is useful for understanding consumer behaviour in computer-mediated environments (Csikszentmihalyi, Abuhamdeh, and Nakamura 2005; Rettie 2001; Novak, Hoffman, and Yung 1999), and "world wide web activity is an activity that can facilitate the occurrence of flow" (Chen, Wigand, and Nilan 2000, 263). It is therefore incumbent upon scrupulous web designers to attempt to engender flow in their sites' visitors, if at least because "commercially, the concept of 'stickiness' [a synonym for flow] is a crucial element of web design" (Rettie 2001, 106). Similarly, Novak et al note that determining how to create commercial online environments that "engage consumers so that important marketing objectives such as extended visit durations, repeat visits, and online purchase objectives may be achieved are critical" (1999, 32).

To produce the flow experience in Internet users, scholars have proffered a few theories. I have identified four key design elements in relation to internet use and flow. Firstly, the object of use must be challenging for the user, yet the user should feel a sense of control over the objective

(Chen et. al. 2000, 275). That is to say, a user might experience might experience a flow state if they are searching for information that might not be immediately apparent, yet the user is aware of how to use the search engine. Secondly, "a compelling online customer experience is positively correlated with fun, recreation and experimental use of the web" (Novak et. al. 1999, 32), and by extension, Rettie claims "designing sites with increased interactivity should promote flow" (2001, 120). Thirdly, explicit advertising normally disrupts the flow state (ibid). Fourthly, flow is enhanced where "download sizes are minimized and site navigation is easy" (ibid, 122).

Flow in Games

Similar studies to those conducted for flow in Internet usage have been conducted for games. Indeed, Hsu & Lu claim their results reveal "social norms, attitude, and flow experience explain about 80% of game playing" (2004, 853). Naturally then, scholars have attempted to construct design frameworks or elements to engender flow within game users, of which the most common recommendation is to appeal to a player's intrinsic motivations (an idea addressed above as one of Gamification's primary pitfalls. Many have noted that a game should be enjoyable in and of itself, in which case more enjoyment is yielded from the process of playing the game than the satisfaction of completing the game (Deterding 2010; Fullerton, Swain, and Hoffman 2004; McGonigal). This theory leads to the somewhat counter intuitive, yet nonetheless cogent, idea that the "perceived usefulness of a game does not drive participation. Players continue to play without 'purpose'" (Hsu and Lu 2004, 862). Thus, provided the requisite equilibrium channel of skill and challenge is attained, a game player will experience flow without direct game objectives.

The Implications of Game and Internet Flow Studies for Gamification

Assuming Gamification in new media is somewhat of a symbiosis of web usage and Game play, a combination of the results of flow studies in the two areas should enable a framework applicable to Gamification. As a consequence, I have identified four key aspects of design to engender flow in Gamification applications: (1) intrinsic enjoyment and a sense of 'fun'; (2) a concurrent sense of challenge and control; (3) limited or peripheral advertising; (4) a conducive interface that is not disruptive to the enjoyment of the application as a whole. Thus, while Jeggers claims the "concept of flow is difficult to implement within design" (2007, 63), these four elements can nonetheless be applied to examples of current Gamifiaction applications – thereby highlighting their success.

Measuring Nike+ Against a Flow Framework

When Nike released Nike+ in 2008 it "gamified exercise" (Mangalindan 2010). Originally released as an iPod application, the software now operates on a number of operating platforms including iOS and Android. The primary function of the software is that through either a pedometer placed inside your shoe, or via the phone's GPS tracking device, Nike+ monitors distance, pace and calories burned, and stores the data both on the phone and at the user's online profile (Zichermann and Cunningham 2011, 101). The app is considered "one of the most polished gamified experiences on the market today" (ibid), and up to 2010, the company had sold 1.8 million Nike+ pedometer chips (Mangalindan 2010). The perceived success of the app though, is at least largely to do with the manner in which its Gamification elements are conducive to flow.

To achieve flow, Gamification mechanics should be 'playful' and encourage intrinsic motivation. Indeed, Nike+ includes words of encouragement by high profile athletes played at seemingly surprising milestones – for example, "Congratulations," Tracy Morgan will say, "you ran more miles this week than last. Awesome work!" Although these milestones certainly constitute extrinsic motivators, they are nonetheless playful, and their apparent randomness inspires pleasant surprise. More significantly for a flow perspective though, the app also appeals to intrinsic motivators. Putting aside the fact some people might be intrinsically motivated to exercise, Nike+'s "tag" game is designed to induce the intrinsic motivation to have fun (albeit whilst doing exercise). A "tag" game lets players challenge their friends to run faster or further on their next run, or risk becoming "it." According to Zichermann & Cunningham, this is a "clever mechanic with a built in viral loop: once you're "it," the other players are given a "Trash Talk" wall to encourage you to start a new challenge and tag someone else. Thus, players are constantly engaged in an ever evolving and motivating game.

Another idea crucial to the concept of flow stipulates that Gamification should represent a challenge that does not exceed the player's perceived skills, meanwhile ensuring the player retains a sense of control over his participation. Simply by virtue of the detailed statistics Nike+ takes of a player's run, the application encourages the player to challenge himself to beat previous statistics. However, Nike+ also enables players to meet specific challenges established within the application or set by other users. For example, an unfit player will be challenged (yet not beyond her perceived capacity to achieve the challenge) to run 3km in under 20 minutes. Meanwhile, a fitness guru might be challenged to complete the "run an Olympic qualifying 5km time" challenge. Thus, Nike+

caters for a range of competencies, and thereby enables players to enter the "flow channel" when competing. Moreover, players retain a sense of control over such challenges because they can elect which challenges to undertake.

A third tenant proposed as a means to achieving flow in Gamification requires minimal advertising present (or at least noticeable) within the application. Again, Nike+ effectively embraces this concept. Aside from the name, the application does not direct the player to any Nike Advertising. As a consequence, the player can use the application without an advertising disruption to her flow state.

The fourth and final design element to encourage flow within gamified applications has to do with simplicity of interface. Indeed, as mentioned above, designers should aspire to implement an interface and system that is smooth as possible without detracting from the desired activity of the player. In Nike+'s case, the desired activity is to get running; and as is demonstrated by the simplistic interface in figure 2, Nike+ allows it's players to do so in an efficient and customisable manner. The player need only select customisations according to a few clear options (for example, inside or outside) and click the "Start Run" button.

Therefore, since the Nike+ phone application comprehensively satisfies a number of the design requirements to engender flow, and since flow has been demonstrated to engender "stickiness," engagement and continued use of an application, it is little wonder the application has been recognised for both its commercial success (Mangalindan 2010) as well as its sound employment of Gamificaiton mechanics (Zichermann and Cunningham 2011, 102).
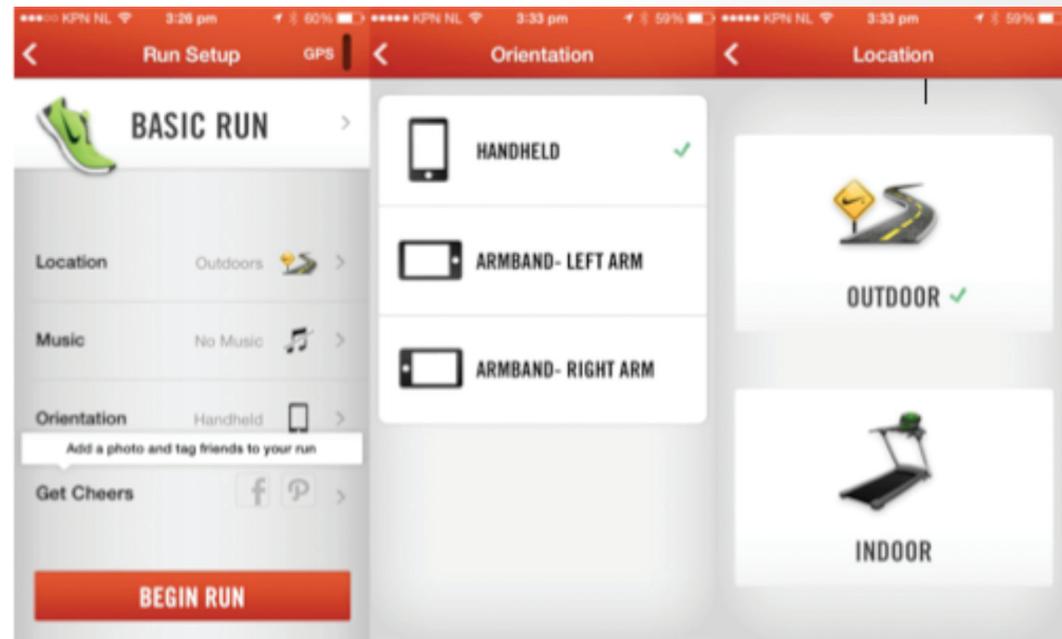
Figure 2: A selection of three screenshots of the Nike+ interface.

points-based systems, and the sacrificing genuinely engaging content.

Through an attempt to appeal to player flow though, Gamification designers should be able to counteract such criticisms and develop applications that are genuinely engaging and sticky. I have identified 4 key components to successful flow-inducing design: (1) intrinsic enjoyment and a sense of 'fun'; (2) a concurrent sense of challenge and control; (3) limited or peripheral advertising; (4) a conducive interface that is not disruptive to the enjoyment of the application as a whole). Together, these components serve to ensure a player achieves an optimal level of equilibrium between his or her perceived skills and the perceived challenges posed by the application. Nike+ illustrates such design considerations, and is regarded as an extremely successful application. Therefore, despite Gamification's numerous doomsayers, I remain optimistic the technique can remain an effective technique for marketers and those concerned with their customer's and user's – or perhaps more appropriately, player's, long-term engagement with a given application.

Conclusion

There is a long history of the implementation of game mechanics in non-game contexts (Nelson 2012) (McGonigal 2011). Although the trend has recently been labelled Gamification, and although the term has encountered a raft of criticism, it is likely game mechanics will continue to be used as a motivating force long into the future (Schrape 2013). However, in order to successfully implement such mechanics, Gamification designers need to avoid the commonly encountered weaknesses of the concept, such as the failure to inspire intrinsic motivation, the inherent ineptitude of some

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Notes

1 Similarly, Deterding et al note, "there has also been no close scrutiny of whether the term actually denotes a sufficiently new and distinct phenomenon" (2011, 9).

2 Interestingly, neither Schrape, Deterding nor McGonigal are considered within the top 40 Gamification experts according to www.leaderboard.com. Ian Bogost is ranked 25th, while Gabe Zichermann is 7th. However, this leaderboard is organized rather arbitrarily because it is based entirely upon a combination of the number of Gamification-related tweets and retweets individuals have produced on a monthly basis. Therefore, the theoretical concepts as purported by the likes of Deterding and Schrape are not undermined or lose any authority in an academic treatment of the concept.

3 "We can define game as an exercise of voluntary control systems in which there is an opposition between forces, confined by a procedure and rules in order to produce a disequilibrial outcome" (Avedon and Sutton-Smith, 1981, 7).

4 "I perceive four common factors: representation (a formal system that subjectively represents a subset of reality), interaction, conflict, and safety (the results of a game are always less harsh than the situations of the game models)" (Crawford, 1982, 19).

5 "A Game is a form of recreation constituted by a set of rules that specify an object to be attained and the permissible means of attaining it" (Kelly, 1988, 50).

6 "[A]n activity which is essentially: Free (voluntary), separate [in time and space], uncertain, unproductive, governed by rules, make-believe" (Callois, 1960, 10).

7 "[…] A free activity standing quite consciously outside "ordinary" life as being "not serious", but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest, and no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It promotes the formation of social groupings which tend to surround themselves with secrecy and to stress their difference from the common world by disguise or other means" (Huizinga, 1950, 14)

8 Play: "A broader, looser category, containing but different from games" (Deterding et. al. 2011, 10). See also Callois (1976).

9 Callois coherently elucidates this distinction in his discussion of paidia and ludus constituting two poles of play activities, where paidia denotes a more free-form, expressive, and improvisational recombination of behaviours and meanings, ludus (i.e. 'gaming') captures playing structured by rules and competitive strife towards goals (1961). He bases his discussion upon Huizinga's seminal "Homo Ludens" (1950).

10 This is particularly surprising considering famous institutions and organisations like Boy Scouts and the Olympics have awarded badges (or medals in case of the Olympics) to commemorate achievement and signify rank.

11 However, as is discussed in the criticisms of Gamification Section of this paper, the concept of badges (although not specifically to do with Foursquare) has inspired ire amongst Gamification critics.

12 The concept of Gamification within a game has raised a semantic debate concerning whether a game can be further 'gamified.' While Deterding et al suspect that this constitutes a Metagame – thereby precluding its classification as Gamification, they concede that the area needs further study (2011, 5). Others though, like Zichermann, have no qualms with the idea, and consider Metagame elements part and parcel of Gamification mechanics (2011, 45). Nevertheless, for the sake of an exploration of Gamification mechanics, Metagame elements or "Gamified games" still provide illuminating examples of potential Gamification devices.

13 While data collection is not altogether relevant to enquiries concerning the efficacy of Gamification mechanics, Chorney makes the interesting observation that "by creating a gamified environments, companies can create a world where they have complete control over the information within that world" (2012, 20). He states this means "companies can control access to the environment and this access often comes at the cost of personal information" (ibid).
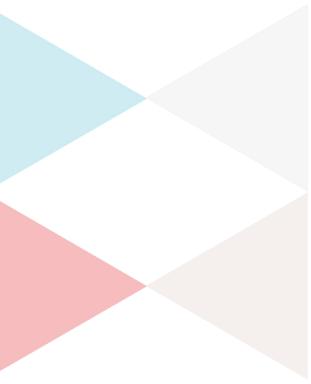
YOU PASSED LEVEL 7
GO TO THE NEXT LEVEL
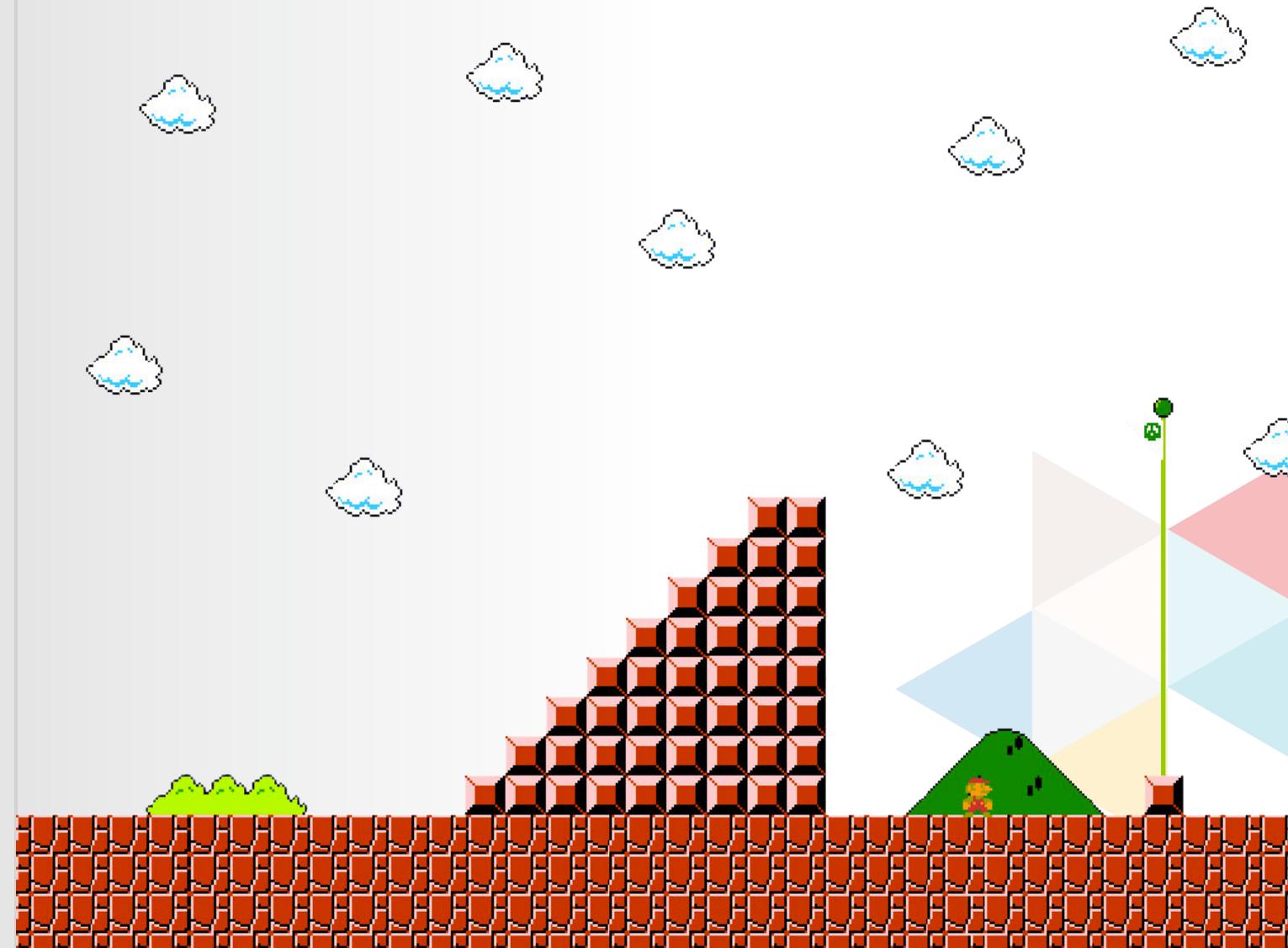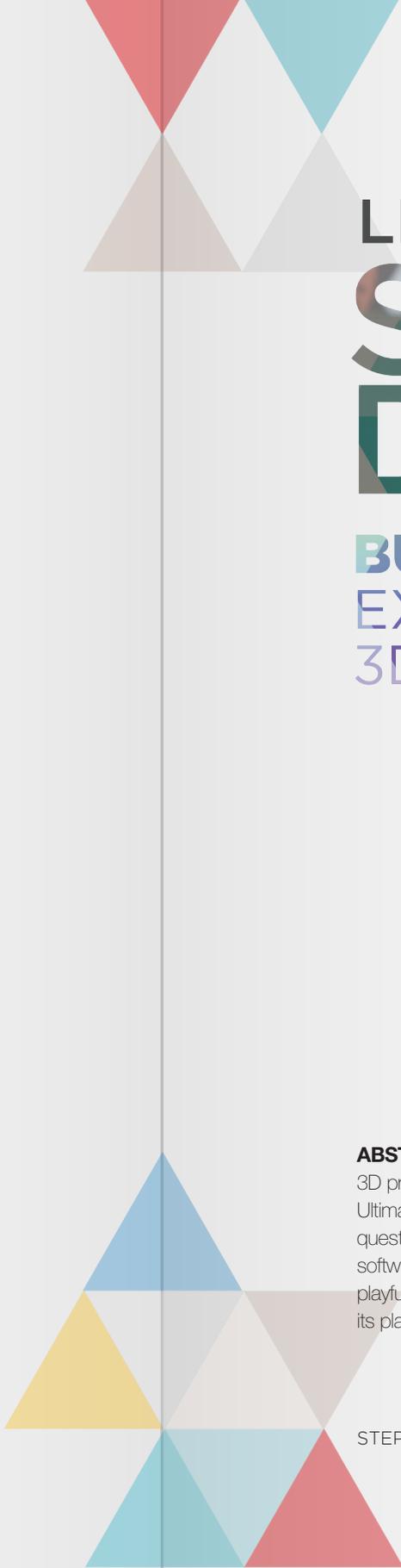
LEVEL 8

STEPHANIE DE SMALE

BUILDING MATERIAL:
EXPLORING PLAYFULNESS OF 3D PRINTERS

ABSTRACT - This paper explores the practice of 3D printers from a playful perspective. Using the Ultimaker Original as a case study, it addresses the question of whether the practice of open source software and hardware in 3D printing is inherently playful and how the user affects and is affected by its playability. After examining the materiality of open source development and hacking processes in the Ultimaker Original, I will argue how playfulness of 3D printing stimulates hacking the 3D printer. From a broader perspective, the playful practice of 3D printing can be seen as part of a general development towards the ludification of culture.

Introduction

3D printing for consumers is an idea that has been in development since 2004 by Adrian Bowyer and a select group of enthusiasts in the RepRap Project (RepRap 2013). One of those people was Erik de Bruijn, who co-founded the Ultimaker, an "open source, large build platform derivative of the RepRap project" (RepRap 2013). RepRap, Ultimaker and others, supply do-it-yourself (DIY) kits for users to build their own 3D printer. When looking into the production of these consumer 3D printers, I found that companies like Ultimaker have a large community of users that "hack" the software and hardware in these printers, and in turn help innovate this technology. There seems to be a certain playfulness in the practice of building and hacking a 3D printer.

In his recently published manifesto, Eric Zimmerman argues "the 21st century will be defined by games" (2013). He states "when information is put at play, game-like experiences replace linear media. Media and culture in the Ludic Century is increasingly systemic, modular, customizable, and participatory. Games embody all of these characteristics in a very direct sense" (Ibidem). Although I do not disagree with Zimmerman, perhaps a more nuanced approach is desirable. "Game-like experiences" relate in a direct sense to playing computer games, and involve skills and knowledge related to games. As Katie Salen and Zimmerman himself have argued, there are multiple layers of playful expressions, game play, ludic activities and being playful (2004, 304). Where game play is the most rigid structure, ludic activities are less formal and being playful is a much broader category of play. As some scholars have already argued, we could speak of a "ludic turn in media theory" (Raessens 2012). To analyze culture from a play perspective instead of a game perspective, would open up an entire spectrum of media objects for game research.

Not only playfulness of the object, but also playfulness of culture. Many game scholars agree that digital technologies seem to advance the ludification of culture (Raessens 2006; Montola et. al. 2009; Deterding et. al 2011). In this sense, the practice in 3D printing is part of a larger general development towards the ludification of culture.

This paper deals with the notion of playfulness of the 3D printer Ultimaker Original. It addresses the question of whether the practice of open source software and hardware in 3D printing is inherently playful and how the user affects and is affected by its playability. Play perspective allows me to review the playfulness in the building and appropriation of DIY 3D printers, and their focus on open source software and hardware practices. This perspective of play serves as a hermeneutical tool to analyze hacking as a playful practice. Also, it permits me to investigate the ontologically playful nature of media phenomena like 3D printers. The framework for playability will be based on the notion of play and playability defined by game scholar Julian Kücklich. Kücklich argues that users experience freedom in media practices when submitting by the rules, which relates to the experience of pleasure of being in- and out of control (2004). According to Joost Raessens (2012) and Douglas Mark Rushkoff (2012) this dynamic constitutes four levels of playability, which can be understood as four stages of a player's interactivity.

Having studied the practice in Ultimaker Original intensively for two months and visiting the Ultimaker company in Geldermalsen (Holland) to learn more about open source hardware and software processes in 3D printing, I will use Ultimaker Original as my main case study. Also, I have reviewed a selection of academic literature and media texts on 3D printing. Scholars like Patrick Hood-Daniel, James Floyd Kelly and Brian Evens write about the design process and how

a 3D printer works, but remain descriptive in their literature. To investigate the playfulness in the practice of 3D printing, I will first analyze the relationship between the user and the design process in open source software (OSS) and open source hardware (OSHW) in the Ultimaker Original. By comparing the modularity of OSS and OSWH processes with LEGO bricks, I will frame 3D printing as a ludic activity. Lastly, to argue for hacking as a playful media practice I will explore the relationship between different levels of playability and hacking practices.

3D printing is LEGO for grownups

Open source tinkering

Open source innovation kick started development in 3D printing for consumers. It all started with RepRap. RepRap is a "low cost open source rapid prototyping system that is capable of producing its own parts and can therefore be replicated easily" (RepRap 2013). Fueling the machine and its development[4], there is a large group of hackers who create and share ideas on the RepRap Wiki. Other rapid prototyping systems, or 3D printers like Ultimaker or Makerbot, are based on RepRap developments (Makerbot 2013, RepRap 2013). It is important to note that this development was based on open source software. Open source software (OSS) is based on the value that software is freely released. 'Free', in this context, means free for the public to distribute, modify and use. [1] The Open Source Initiative (OSI) has defined the core of free software in the Open Source Definition. OSS is based on open distribution, available for everyone and modifiable (Weber 2004, 5). Officially, for software to be called open source it has to meet the requirements defined by the

OSI [2]. OSS is opposite from software that is closed, not open for distribution and protected for commercial reasons. At first impression OSS may not seem commercially interesting in terms of intellectual property or copyright. However, OSS has proven to be very successful at stimulating innovation and development (Weber 2004; Von Hippel 2005). This is something that we see in the development from high cost, to low cost 3D printers.

Open source innovation like the RepRap Project[3] has helped to develop "lessons that show that users can create, produce, diffuse, provide user field support for, update, and use complex products by and for themselves in the context of user innovation communities" (Von Hippel 2005, 14). This group of programmers fosters the use, sharing and remodeling of software and advocate to contribute improvements. So, OSS is modular, digital and easily changeable due to its open distribution and availability. However, what is interesting in 3D printing, is also the openness in sharing designs and knowledge about hardware.

The open source equivalent to hardware is called open source hardware (OSHW). OSHW works on the same principles as OSS. However, they are not a new phenomenon[4]. Even though OSWH borrows most of its definition from OSS, the open design and sharing of blueprints for hardware differs from the nature of open source software. Software, because of its digital nature, cannot be patented. It can only be kept private. Hardware, on the other hand, is tangible and accompanied with legal issues like patents and intellectual property (Ackermann 2009). While OSS and OSHW are different on an instrumental level, they are interrelated. In some sense OSHW is the physical form of OSS. In some sense they are part of the same family where voluntary participation and actions like making, modifying and distributing are central.

3D printing and LEGO

Pleasure in tinkering seems to play an important role in the development of 3D printing. In open source development Von Hippel highlights fun, intellectual stimulation, creative experience, greater knowledge and acknowledgement as important factors (2005, 60-61). Pleasure and informal learning are important factors for open source innovation. Michel Resnick and Eric Rosenbaum describe tinkering as a specific approach to making and development. "The tinkering approach is characterized by a playful, experimental, iterative style of engagement, in which makers are continually reassessing their goals, exploring new paths, and imagining new possibilities" (2013, 164). Resnick and Rosenbaum explore the possibilities of tinkering in education for young students, and have worked together with the LEGO group to use LEGO Mindstorms in projects. Just like Von Hippel, Resnick and Rosenbaum argue for playful ways to collaborate and gain knowledge about technology.

In some ways, 3D printing is like LEGO for grownups. The physicality of OSHW invites tinkering, playing with the machine. This resembles LEGO bricks, where the user can build, rebuild and share new inventions and ideas. Open source is flexible and can be used for different goals. The user can look into the software and hardware design, because of its open nature. Participation is voluntary, and the earlier successes of open source development are inviting. The interest in 3D printing seems to be more about the technology and how it works. This playful nature creates deeper knowledge and understanding of the technology in 3D printers. But to learn the extent of how the playful nature of the machine stimulates tinkering, I will take the reader deeper into the process of building a 3D printer.

Playful process in building 3D printers

How-to-tinker

After seeing the playfulness in open source, lets take a closer look into the process of tinkering for the user. One of the problems in critically examining the newness of 3D printing is the descriptive nature of academic literature on the subject. When reviewing some books on 3D printers, a lot of them are about building a 3D printer, how to choose one, or how to use one. In *Printing in Plastic: Build Your Own 3D Printer* (2011) authors Patrick Hood-Daniel and James Floyd Kelly explain in detail how to build your own 3D printer. The authors take the reader step by step through the process of cutting the material and assembling it, assembling the motor and motor mount, the thermoplastic extruder, filament drive, mounting electronics, fixing the wiring like connecting power to the motherboard and motor, and finally installing the software (Hood-Daniel and Floyd Kelly 2012. In *Practical 3D Printers* (2012) Brian Evens also describes how a 3D printer operates[5]. Fortunately, in these 'how-to' books there are important clues that can show us how users interact with the rules of 3D printing. They show materiality in the practice of 3D printing. To analyze the materiality of 3D printing, let's try to break open the black box. In order to do this, we will need to examine its affordance, design and appropriation. According to Schäfer, all three aspects are intertwined: "appropriation is related to affordance, because the material characteristics and the design choices affect the act of appropriation. Design and the specific material qualities form the basis for use and appropriation" (2011, 20).
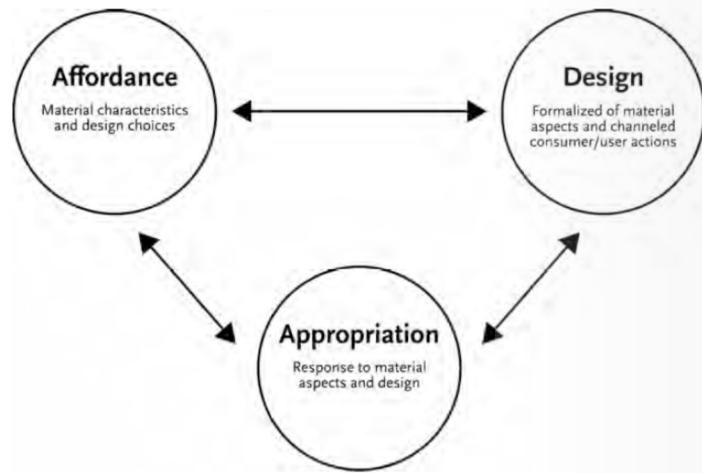
Firstly, looking at the affordance of 3D printing is describing its specificity. Here we are looking at the material aspects of the object, and the stuff that it is made of. Consider, for instance, the design of a couch and how it is made to be seated on. 'Affordance describes two characteristics, the material aspects, or the specificity of an object or a technology, and the affordance imposed on it through the design' (Schäfer 2011, 19). Secondly, when examining the design the need for "evaluation of the specific features of materials used for a designated object, and an evaluation of the user's appropriation to be incorporated into a next level of development" (Ibidem, 19) arises. Lastly, by looking at the appropriation of 3D printing, this allows us to see the integration of 3D printing in everyday use, and how the users are adapting and transforming its original design.

What is so interesting in the design aspects here is that the modularity of OSS and OSHW allow for a multitude of modifications. Users adapt and modify both software and hardware to fit

their wishes and needs. Schäfer also argues the process of design is influenced by the maker's own social context and political mindset (Schäfer 2011, 19). In this case, the open source ideology of sharing design, no commercial ownership and giving back to the community plays an important role.

Tinkering with hardware

Ultimaker encourages users to tinker, and gives them the freedom to hack the software, hardware or material any way they like (Ultimaker 2013a). This affordance exists both in the design process and its specific materiality. In a way it anticipates the specific use of 3D printing, in another way it allows for modifications and different affordances. The DIY-kit of the Ultimaker Original means a user needs to will get hands on with every part of the hardware. Just like LEGO bricks the user has to build the 3D printer with tiny bits and pieces.

The material design of the Ultimaker Original is plywood. This design has two specificities that draw the user into modifying a 3D printer. First, plywood in its bold form invites the user to be creative. You can change the color and finish if you like, or just keep it as it is. Secondly, the user has to put all the pieces of the Ultimaker Original together. The materials that are used to build the frame of the printer, plywood, invite the user to modify the printer by changing the appearance, modifying from the inside creates deeper knowledge on how the device works. The user uses, or appropriates the 3D printer by actually assembling and de-assembling it. In this way, tinkering with a 3D printer is actually part of its everyday use.

The big advantage when building a 3D printer, or in the case of the Ultimaker Original

assembling it, is that the user really gets to know what kind of device they are dealing with. The user is not only building or assembling his or her own 3D printer, but also gaining knowledge about *how* this device works from the inside out. The affordance and design of OSHW invite the user to play. In 3D printing "play is a style of engaging with the world, a process of testing the boundaries and experimenting with new possibilities" (Resnick and Rosenbaum 2013, 163).

Tinkering with software

As Resnick and Rosenbaum stress, a user can also tinker with software. They see "tinkering as a style of making things, regardless of whether the things are physical or virtual" (2013, 166). Open source software in particular invites the user to try out different programs, or even create new ones. In the Ultimaker, there are different examples where users appropriate different types of software to fit their needs. A 3D printer has different types of software that work together to control the printer.

The printer control application is the user interface. The host software, also named printer interface or printer control, is where the whole tool chain comes together (Evans 2012). From this application the printer connects and communicates to its firmware; moves the three different axes; reads and sets temperature for the hot end and the print bed; launches the slicer application and prints the 3D models. Ultimaker Original currently runs on Cura. Interestingly, the engine is developed by a user as a better and faster alternative for Skeinforge, the old engine[6]. Although Cura is fully preconfigured to work on the Ultimaker, you can also use it for RepRap printers. In an interview with David Braam, he states Cura is a lot more playable. You can "play around with your 3D model, turn it around, play around with settings" (Mazzotta 2013). This example illustrates how the playful design of the Ultimaker Original and its open source affordance allows users to appropriate their device.

Control boards need firmware loaded on its microcontroller to make electronics come to life. Firmware is responsible for interpreting G-code commands sent to the electronics from the printer (Evans 2012, 35). Ultimaker Original firmware can run on Sprinter, and Marlin (Ultimaker 2013b). Each firmware has its own features, and the open source design from Ultimaker allows for different types of firmware to be installed, giving the user more freedom to choose a program or develop one of their own.

In short, because of the openness in affordance and the design, a user is invited to play with their 3D printer. The modularity of the Ultimaker Original is like playing with Lego, where the user learns how to build use and appropriate their printer. The tinkering affordance of the Ultimaker Original created space for developers like David Braam to create an application like Cura. The really interesting part about the open source system of the Ultimaker is that the design and affordance allow modifications on both the physical and the digital level, expanding modularity not only on a software level, but also on a hardware level. As such, the ontology of the 3D printer can be seen as playful. Its modularity invites the user to play just like with LEGO bricks: tinker, experiment, and appropriate your 3D printer any way you like.

Playfull printer, playful practice

Playfulness of 3D printing

The modularity and open source development in 3D printing are playful. But 3D printing is also a playful practice. Kücklich argues that a perspective from game studies is especially fruitful to analyze media phenomena, because of its flexible nature and ability to both preserve and criticize their own theoretical framework (2004). When looking at 3D printing from a play perspective, it is necessary to further define it. When we are talking about play, Katie Salen and Eric Zimmerman argue "play is free movement within a more rigid structure" (2004, 304). When looking into the way play manifests itself, the authors group three types of play; game play, ludic activities and being playful (Ibidem, 303).

The practice of 3D printing is a ludic activity. Ludic, meaning "'*of or related to play*' can be play activities that not only form games, but also non-game behavior we call playing" (Ibidem). Being playful "refers not only to typical play activities, but also to the idea of being in a playful state of mind". Here the authors are referring to ordinary activities (Salen and Zimmerman 2004, 303). Tinkering with a 3D printer can be seen as a ludic activity. It is intentional and informal play, but still has some formal rules like the earlier discussed tool chain. In order to work properly, electronics need firmware to operate. Interestingly, as mentioned earlier, the modularity of open source has a playful nature. As shown before system like open source is inherently playful.

Just as the open source system is both digital and virtual, the boundaries between play and non-play seem to fade. Media phenomena like 3D printing account for multiple transgressions of the boundary between play and reality (Kücklich 2004, 14). For instance, our mobile phones give us access to the Internet, carrying potential play with us everywhere we go. He argues there is "ambiguity between openness and closure" (Ibidem). Media practices are ludic, and transgress the playful boundary between digital and everyday life. Moreover, as Kücklich argues, old dichotomies of virtual and real world, or open and closed do not apply (2004). Here he is referring to augmented reality, where play is still mediated by the mobile device.

In 3D printing, the aspect of play is mediated both digitally (software) and physically (hardware). The user is actively involved in the physical creation of a user's 3D printer. Like Lego, the user gets a kit, which the user has to assemble his/herself. Instructions are given with tutorials that are also accessible via the Ultimaker website (2013a). The hybridity of both the physical and the digital aspect pose the need for a higher consciousness of the playfulness in open and closed spaces. 3D printing transgresses openness/closure of play and non-play and rethinks the blurred space of media practices,

Because of its affordance, the open source system is interchangeable. According to Rushkoff "'open source' development can be seen as infinite games" (2012, 248). He argues for a distinction between finite and infinite games and draws his argument based on the theory of James P. Carse:

> The rules are changed when the players of an infinite game agree that the play is imperiled by a finite outcome – that is, by the victory of some players and the defeat of others. The rules of an infinite game are changed to prevent anyone from winning the game and to bring

as many persons as possible into play

<div align="right">(Carse quoted in Rushkoff 2012, 248).</div>

In the infinite play of open source, the rules of the game – as defined by OSI – are, availability, open distribution and open for modification. Interestingly, in 2012 Makerbot CEO Bre Pettis announced that the hardware of their latest 3D printer, Replicator 2, is not open source (Cnet 2012). Makerbot decided to go against the code of conduct, and not release the software and designs for their latest printer. This caused a real uproar in the OSHW community and lead to a few intense discussions on the Makerbot forum about ethics and intellectual property (Makerbot 2012; Cnet 2012; Makezine 2012). The real pain was caused by the commercialization of a product that once belonged to open source play. Even though the first Makerbot designs are inspired on RepRap, Makerbot decided to change the rules of the game and use closed code and hardware on their latest model. From a neo-liberal perspective, they can be seen as a winner. However, from a hacker perspective, the company of Makerbot is cheating. and as such, Makerbot is prevented from winning. The open source system can be seen as an infinite game, where there is a constant oscillation between the digital and physical materiality.

Hacking as a playful media practice

So, when looking at 3D printing from a play perspective, 3D printing is informal, ludic and infinite. The practice of hacking can be seen a mode of media consumption. "Hacking as play has been seen as inseparable from the demands (in terms of expertise and time) of programming" (Lister et. al.

2009, 291). Early home computing for the producers and users meant programming. To run most programs a basic knowledge of code was required. Just as in early home computers, 3D printers require technical skill on both the hardware and software side. The user has to know or learn the 'language' of 3D printing. How does the printer control 'talk' to the G-code in the firmware? What software is best suitable for my needs, and if there isn't any, can I build it? Of course, there are many different types of users.

As we have seen in the notion of play from Salen and Zimmerman, play can exist in both ludic activities and ordinary activities. So what is the scope of playful interaction between the players and 3D printing? Although it was Huizinga (1951) who first theorized different types of players, Raessens (2010) and Rushkoff (2012) have both argued these different levels account for different levels of playability in media practices. The practice of 3D printing can have four different levels of playability; the regular user, the cheater, the modder or programmer. First, there is the user who accepts the fact that the "rules of a game are absolutely binding and allow no doubt" (Huizinga 1955, 11). This would be the type of user that would just be interested in the technology and how the user can play the game. However, open source ideology allows and maybe even entices the user to start fooling around with the process. The cheater who "pretends to be playing the game" (Ibidem) operates at the second level. This player – for example the one who uses cheat codes in computer games – is aware of the explicit and implicit rules of the game and tries to deploy them (against the rules) to his own gain. At the third level we have the spoilsport, or the modder, "the player who trespasses against the rules or ignores them" (Ibidem). This is the user that modifies the game if the system affords it. Finally, there is the "outlaw, the revolutionary" (Ibidem, 12).

In the Ultimaker, the rules of the game stimulate the player to experiment and bend the rules. Download other software, play with settings, and if possible, try to improve your model to your liking. Hacking the 3D printer becomes a level of playability and part of the media practice. Not everybody will redesign their Ultimaker to make it fit their needs. Regular players people just like to print 3D objects. However, the more skilled a user is, the more freedom in the system they experience. The next level is, how can I improve my machine, and this is where hacking as a practice comes to life. As Rushkoff argues, the degree "to which playability is introduced to a closed system reflects the extent to which its participants can set their own rules" (2012, 249). The modder and programmers are exempting practices of hacking. The more the user hacks, develops or modifies, the more knowledge over the technology the user gains.

It is clear that the playfulness of 3D printing lies more in its technology and practice, than the act of printing. And as we see in the Ultimaker, hacking as a playful practice contributes largely to this development. Looking at the regular player, the objective is just to print cool objects. The tinkering involved is just putting the Ultimaker Original together, and when it works, it works. "play itself usually consists of learning those rules of the game world, as well as the interface" (Rushkoff 2012, 251). But as Kücklich argues, the pleasure in playability for the user is the "individual who upholds the rules simply for the sake of the pleasure she derives from submitting to them" (2004, 33). Being able to print anything you like depends on submitting to the rules of the interface. But interestingly, the rules of playing with the Ultimaker are almost teasing to bend the rules and appropriate the machine to your liking, either physical or digital. This itch can be traced back to the "intimate relationship between pleasure and control" (Ibidem). In the open source

system, a player gets rewarded for their hacks and modifications. Hacking as a playful practice ultimately leads to more control within this system.

Oscillation of in- and out of control

According to Rushkoff the level of playability reflect autonomy and agency of the player (2012). But, in the open source system, breaking the rules is an unwritten rule. So I think we should make the distinction here between individual agency and autonomy and systemic agency. Ultimaker has a close relationship with its modders and programmers. The company rewards hackers with the opportunity to develop their hacks to products and stimulates users to build new stuff, like LEGO. On their website, the company advocates the freedom to hack your 3D printer any way you like, either the hardware, software, electronics or material (Ultimaker 2013a). Increasing agency comes in different forms; personal pleasure; a deeper knowledge of the technology and working for bettering the community. As Kücklich argues, the pleasure of control exists on multiple levels, on an individual and systemic level (2004, 36).

Let's zoom into an example of an individual level: the Ulticontroller, created by Bernhard Kubicek in 2011 for Ultimaker Original. In 2012 he wrote his personal experience down in a "tale of how a mere playful hardware hack developed into a product" (Kubicek 2012, 1). Bernhard Kubicek bought the Ultimaker Original and put it together in 2011. Ultimaker allows users to use different types of firmware on their 3D printers. Kubicek describes how he modified the firmware Sprinter 2 to run on the Ultimaker Original, and "made this configuration available to other people in the growing Ultimaker community" (2012, 1). He worked together with people from this community

to increase the usability and to spread his hack. Because of the technical affordance of Sprinter 2 to support SD cards, he developed the idea to print directly from an SD card in the Ultimaker. This means a user can print without the use of a computer and the software (Ibidem). He developed his first prototype, and writes: "The choice of how it should do what it should do were done by me. My satisfaction depends on how fast I can control the machine"(Ibidem 2) This quote illustrates pleasure of being in control (of the machine). On a personal level, Kubicek's pleasure comes from governing his own machine and a better understanding and deeper knowledge of the rules that govern the OSS and OSHW system.

In the example from Kubicek, we can see that the user has gained more autonomy. But the moment commercial interests are involved the oscillation of being in- and out-of control is visible. Other users and eventually Ultimaker got interested in the Ulticontroller, and organized a hackathon to tinker with the first prototype of the Ulticontroller. After the hackathon, Kubicek handed control over to Ultimaker, who developed the second prototype. For the hack to become a product that Ultimaker could sell, Kubicek had to hand over control of the device. According to himself, he was too involved emotionally; "If somebody pointed out how I could improve my panel, it most often felt like a personal insult". Here the loss of control is unpleasant at first, however later on the loss of control is pleasurable again.

Improvements on the prototype proved to be a success: "the brain could not figure out, why it is so much better now than any of my designs attempts. I liked the shape. Honestly, I never thought about that" (Kubicek 2012, 4). Eventually, Kubicek learned more about industrial design principles, and gained a deeper knowledge on developing workable prototypes for the 3D printing

community. Furthermore, on the Ultimaker store, they give full credit to Kubicek and link to his personal story (Ultimaker 2013c). As Kücklich argues, "the loss of control is often experienced as enjoyable – if it alternates with the experience of being in control" (2004, 38). It is because of this oscillation of being in- and out of control on an individual level, that hacking – as a practice – seems to give more control to the user.

Kücklich argues "the media practices that have emerged with new media technology draw attention to the fact that users are not content with the level of control they are granted by the producers of this technology" (2004, 36). He is referring to 'illegal' download activities and 'ripping' of CD's and DVD's. From the constructivist micro approach, the practice of hacking gives more control to users because of the dynamic relationship of affordance, design and appropriation. Redesigning the system, or changing the rules increases 'the notion of pleasure the user experiences (Kücklich 2004; Raessens 2012; Rushkoff 2012). Further research can go deeper into the relationship of control and agency on the systemic level.

So, from a play perspective 3D printing is an informal, infinite play in both hacking as a practice, and the nature of 3D printing. In this type of play, the rules are to break the rules. Just like LEGO, 3D printing is made out of building bricks that can be built, broken down, rearranged and put back together in a new form. There are multiple levels of playability, where the modder and programmer have the highest control on an individual level. There are still commercial interests that have agency on a systemic level, so further research may look into the dynamic relationship between the individual and systemic relationship of control.

Conclusion: learning to play by the rules

As I have argued in this paper, 3D printing is more about the development of its hardware and software, than about the stuff that comes out when you hit print. This development is made possible by the collective effort of enthusiastic hackers. Where hackers used to be political activists in claiming the 'open space' of the Internet (Barlow 1996), now they are integrated in neo-liberal activities and invited in hackathons and forums to share ideas and knowledge. According to Henry Jenkins, this active involvement of media culture has begun to alter the character of new media. He recognizes the crossing of grassroots movement and corporate media through the concept of *Convergence Culture*: Media-savvy consumers turn into participants and are creating their own knowledge communities (Jenkins 2006). This influences the use of playful media. In this light hacking becomes a playful media practice. On a meso-level, companies like Ultimaker seem to stimulate such an environment, however more research needs to be done about their business relationship and the dynamic between user and producer.

According to Mirko Tobias Schäfer, when analyzing the use, change and modification of technology like 3D printing, material aspects have to be considered. He argues that "affordance describes two characteristics, the material aspects, or the specificity of an object or a technology, and the affordance imposed on it through the design" (2011, 19). Analyzing the black box of the 3D printer shows its playfulness on a physical and digital level. The modularity of both software and hardware, and its open source design invites modification. As Rushkoff argues, open source can be seen as infinite (2012). Participants and nonparticipants work together im- or explicitly. I have argued from a play perspective; the hybridity of physical/digital hacking in open source

environments stretches playful activities into a playful nature.

In their discussion on playful media, Montola et. al. postulate the function of pervasive play in teaching media literacy skills. They argue it is a "societal response to the need for advanced media literacy" (2009, 276). This is in agreement with Resnick and Rosenbaum, who see hacking "as a valid and valuable style of working, characterized by a playful, exploratory, iterative style of engaging with a problem or project" (2013, 164). This paper has been an effort in showing how hacking as a practice teaches vital skills and knowledge of the 3D printer and its open source design. Open source software and hardware design break the 3D printer up into modules. The modularity of 3D printing is like playing with LEGO. LEGO bricks can be put together, broken apart, shuffled and appropriated in different ways. In this process, the user gains more knowledge on its technology. From a wider perspective, the hacking the 3D printer can be seen as part of a general development towards the ludification of culture.

Seeing media phenomena through the lens of play opens up new perspectives on the relationship between user and producer. In this paper, I have considered playability as a capability that can occur on four levels; the player that accepts the rules; the cheater who chooses to follow or break the rules; the modder who creates new situations within the game's framework; or the programmer who either fundamentally alters the game, or designs a completely new one (Raessens 2012; Rushkoff 2012). When looking at the development of 3D printing, the modder and programmer are the players who gain a higher notion of control over the machine. The modder changes software, like what type of firmware is being used, or installs an open source upgrade to fit his/her needs. The programmer takes it to the next level, and creates OSS like David Braam,

designing a new printer control that fundamentally changes the way the 3D printer is used. Hacking as a practice gives the user more control on an individual level.

It becomes apparent that "playability is dependent on the dialectic of being in control and out of control" (Kücklich 2004, 38). From a constructivist approach, hacking the Ultimaker, the user gains a higher level of control over the machine, deeper knowledge and autonomy. Bernhard Kubicek upgraded the usability of the Ultimaker by adding a controller, making the computer obsolete. This micro-level of playability is related to the notion of control over the machine. From a meso-level, hackers, producers and 3D printing technology are actors in a complex process. Further research from a play perspective in the dynamic network of actors and actants may shed more light on conditions in which ludo-capitalistic, cultural and technological factors are playfully shaped, and shaping.

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Notes

[1] The term Free Software was coined by software freedom activist Richard Matthew Stallman, founder of the GNU project. GNU project's objective is to give freedom and control to computer users and their devices, by collectively developing and sharing software that is based on the rights for users to: Freely run the software, copy and distribute, study and modify the software (http://www.gnu.org/gnu/manifesto.html.en).

[2] Extra information legal issues regarding the licencing in open source software and hardware, see the article 'Towards Open Source Hardware' by Jan Ackermann (2009).

[3] "[T]he cheapest commercial machine would cost you about €30,000. And it isn't even designed so that it can make itself. So what the RepRap team are doing is to develop and to give away the designs for a much cheaper machine with the novel capability of being able to self-copy (material costs are about €350)." (RepRap, 2013)

[4] DIY electronics have been around since tinkering with the radio. Fittingly, Tucson Amateur Packet Radio (TAPR) gives a commonly used definition of OSHW on their website:
"Open Hardware is a thing - a physical artifact, either electrical or mechanical - whose design information is available to, and usable by, the public in a way that allows anyone to make, modify, distribute, and use that thing. In this preface, design information is called "documentation" and things created from it are called 'products'." (TAPR, 2013)

[5] The tool chain is based on operating the 3D printer from a computer. The printer control application brings in the 3D model and sends it to a slicer application. Then, the printer control communicates with the firmware (specialized code), which runs on the electronics platform. The firmware controls electronics hardware to send the 3D objects according to the instructions received from the printer control and send data (temperature, positioning and other information) back to the control application (2012, 29). With this tool chain, Evans explains the basic operation of a 3D printer.

[6] There is a separate application called a slicer to generate the path for the printer extruder, which takes a solid 3D model and

slices it into layers suitable for 3D printing. This process makes the code that tells the 3D printer where to move the extruder, when to extrude plastic, and how muck to extrude. These commands are called G-code, and are sent from the printer control software to the firmware on the electronics. The electronics are responsible for interpreting these codes to control the printer motors and heaters. The most widely known slicing engine was Skeinforge, developed by a user in The RepRap Project (Evans, 2012). Different companies use different engines, with all of their own algorithms. A downside of Skeinforge is the time it takes to translate 3D model into slices (Mazzotta 2013). Right now Ultimaker uses Cura, which has its own slicer application and is a lot faster then Skeinforce. Cura was a solution for the usability of ReplicatorG. ReplicatorG is a printer control originally developed by 3D printing company Makerbot. Where Skeinforge was the slicing engine that was widely adopted in the early days of the RepRap project, ReplicatorG, and the popularity of the MakerBot printers made this application synonymous with 3D printing' (Evans 2012, 43).

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