The Idea of Realism and Virtual Realism To Develop Immersion In Video Games

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Abstract

The concepts of realism in video games have been storming around the game communities for decades. Game developers and market consumers have been actively participating in developing styles and techniques to deliver realism into video games, and all these contributions have been revolved around various core concepts and rules of game design throughout the years. Many different researches and studies have been conducted in order to improve the so-called concept "realism", and a vast majority of game developers have implemented this core concept into their work using various unique aspects. Some have used interrelating and parallel aspects, meanwhile some had used a particularly different aspect of game design or development to achieve the desired game feel. One of the biggest industry leading game genre, which is First Person Shooter genre, has been actively used to pursue realism, at the same time has been the main and crucial style of design used to pursue realism throughout the years. The idea of "seeing through character" and "being there" has led many game developers to use first person perspective as a core idea to transmit realism to the players. In this paper, the overly complicated but at the same time purely simple process of achieving realism, will be reasoned, discussed and explained, with examples mostly given from first person shooter genre. However, in order to produce logical and rational reasoning to the findings, one must first understand what "realism" and "virtual realism" are and how they work, in video games. So, by using definitive terms, dictionaries, various studies, and the idea of "play" itself, backed up by gameplay experience, game history, a conducted experiment and my personal experience and knowledge about game development, I will try to conduct a rational understanding of realism in video games. So that we will be able to generate clearer ideas about using it to achieve immersion, through virtual realism that would be created during the process.

1 Introduction

Initially, diving into the definition of realism might give us some ideas to start with: "the quality or fact of representing a person or thing in a way that is accurate and true to life.". In our case, a person or a thing would be our beloved video games. So, the concept we are trying to understand is the representation of video games that would be suitable, accurate and true to real life. What does it mean, real life? Here we have a really huge concept and it would be interfering with many studies, especially on cognitive science, since the perception of life is all dependent on the psychological assumptions of a human being. That's why, the depths of cognitive science will not be discussed in this paper, neither the philosophical aspects. However, we must relate to one's brain, and its perception of real life, to accurately evaluate realism and the particular aspect of it that is implemented in video games. The combination of direct definition of realism –elements of the game being accurate to real life- and the perception of human brain on these elements is the realism we are looking to understand and accomplish, which is what I like to call "virtual realism", which might be confusing at first, but hopefully will be unwrapped along with topics discussed in this paper.

If we are to look the subject from a perspective of human perception and recognition, we can easily link realism with the concept of "immersion". Immersion is one of the key concepts that game designers have been trying to achieve throughout the years along with highly related subject of "flow". They are the main elements that would make a game "likable", along with making the player hooked up on the game. The link between realism, immersion, flow and play is the hearthstone of this paper. In order to further explain the point, we can say using "realistic" elements might be used to generate immersion and flow, which then generates the "virtual realism" we are talking about. When looking at realism, simply determining the quality of singular aspects like graphics, audio, mechanics is not solely crucial neither holds too much of a significance, we have to look at how these concepts combine together and generate an idea of play that drives immersion and flow, eventually leading the idea of "hooking" in the player's mind. In his research about immersion and realism in video games, Daniel Wilcox-Netepczuk had pointed out important findings about these concepts. They revolve around the idea that singular elements like graphics, audio and presentation, which fall into the category of "shell" structure of a game, might have a huge

positive impact on the ideas of immersion and realism. Significant studies have been conducted throughout the years had shown multi-aspect results of these shell elements, driving realism to achieve immersion. Some games had highly benefited from these elements, while some were unaffected. Even some studies found out that trying to implement realism through shell elements is a high-risk process due to the simple fact that any flaw in the implementation of these elements will directly play role in breaking the mood, killing the immersion, thus interfering with our idea of "virtual realism". Now, all these links and concepts might look interrelated and unnecessarily mixed, it will easily wrap up in one's mind once we define some particular terms, using simple and direct manners.

2 Realism in Video Games

The basic meaning and definition of realism has already been discussed. Now it can be the right time to talk about the idea of realism, in its basic and most naked form, and how it is reflected to video games. As mentioned, it is mainly reflected through the shell concepts of a game, as well as with some direct links to core gameplay. If we are to look at those concepts, specifically in first person genre with solid examples, we can understand the basic outline of directing realism into video games.

2.1 Graphics

The controversial element that has been debated for years amongst many different player and game developer community is the graphics. As the technologies and hardware have been developing exponentially over the years, the game engines had been following these improvements with high speed. While there were custom tailored game engines back in 90s and 2000s, that case have changed as we come closer to today's engines. Especially with the amazing development of Frostbite Engine developed and maintained by EA Dice and Crytek's outstanding engine CryEngine, game industry had skyrocketed in the means of graphics. Not to mention the amazing rendering pipelines of engines like Snowdrop, Unreal Engine, Chrome Engine 6 and many more. With the remarkable features of these engines, graphics quality in games have been amazingly increased and the idea of realism has implemented more accurately. Common to all engines, the main idea to implement realism

has been flown through the concept of "lighting". By accounting for the real physics calculations of light photons, most game engines had transferred successfully from static lighting to dynamic lighting, which is consisted of the idea of light bouncing. In first person shooter games, where the camera is the main perspective of player and sees the environment in usually human to surroundings scale, the developers have tried to accomplish realism by highly introduced concepts of lighting, light bounce, reflection, global illumination and shadowing. Most of these lighting features, which are usually not understandable as standalone by players but perceived as "realistic" when combined together, uses hundreds of features which undergo by the bridge and is not detected by the casual player to create real-life looking photorealistic environments that are sustainable and maintainable under a specific frame rate. For example environmental lighting, or sky lighting, is the specular highlight, color and brightness adjustments of environmental objects from the skybox that is used in the game. With the change of skybox or sun lighting, the reflections, colors, brightness and physically based rendering features on the materials of any objects over the scene drastically change. This is one of the biggest visual enhancement that was made that drives the idea of realism.

One other huge concept that encapsulates the concept of graphics is the foliage. The rendering –which is the process of reading objects and reflecting them to player screen based on calculations basically – of foliage objects like grass, tree, bushes and more, has significant impact on realism (Figure 1). In real life, a terrain area specifically lower than another area is more likely to consume water, due to the gravitational movement of water through the earth, which shall make the foliage on top of that area to be greener and more alive than the other area. Representing an idea like that, in a game landscape and rendering this logical and physical fact accordingly is a huge concept. One player might not recognize the instance of this concept directly, but when looked over a specific terrain, the color combination of this foliage, as well as the lighting bounces and shadowing from even a single leaf, creates the general real-life looking visuals, which creates the photorealism in the players mind.
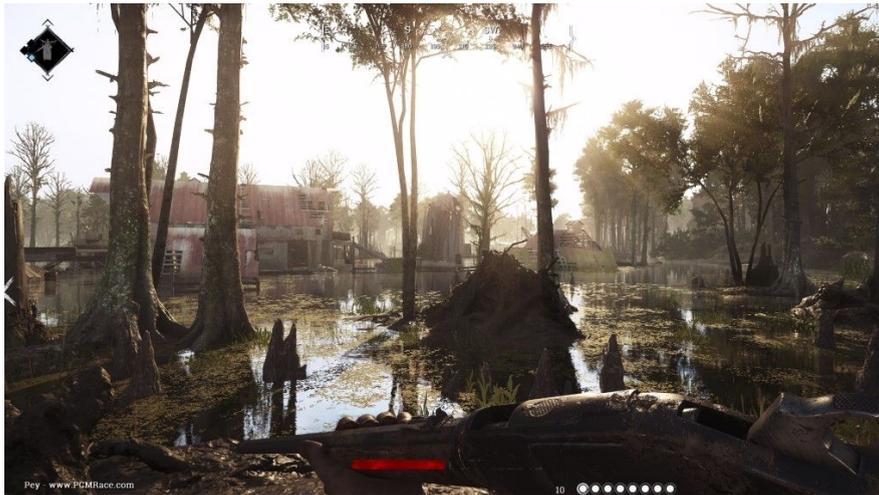
Figure 1: Lightning effects on foliage throughout the environment. Crytek's latest release, Hunt Showdown. Notice how global illimunation, light bounces and reflections work on the foliage and player's weapon.

Moreover, post processing on player's camera play significant role to achieve realistic looks. Post process is the rendering process done as overlay to the final image, after every single object is calculated and reflected to the screen. The process uses the data and final results of these images, as well as the current world data like wind, lighting, time of day etc. To bypass particular effects to create realism. The biggest example of this can be god rays, or some may call it sun shafts (Figure 2). They are the rays of light, that is visible on specific lighting conditions where light usually travels through a narrow space like window, holes in walls or through tree leaves.

Figure 2: God rays travelling through the crack in the ceiling, Battlefield 4.

Another significant post processing effect to create realism is the process of Anti-Aliasing (Figure 3). Aliasing is the problem that occurs when dealing with high resolution and low resolution images. It is the creation of digital artifacts when processing a high resolution image at lower resolutions. Anti-Aliasing is the process and combination of various algorithms used to remove these artifacts to achieve high definition image and is one of the most highly impacting post process effects that have been used to achieve smooth, clear and realistic image.
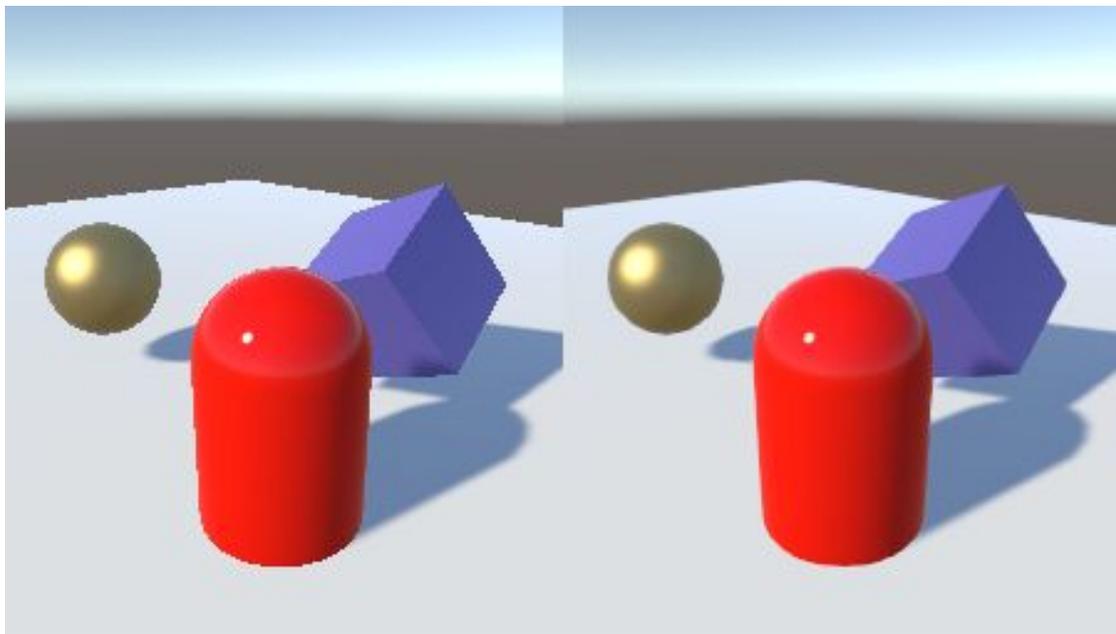
Figure 3: Anti-Aliasing comparison taken from the game engine Unity 3D. Notice the difference around the edges of objects.

Along with mentioned effects, many others like Tone-mapping, Bloom, Color-correction, Eye Adaptation and Depth of Field have been used to simulate human eye perception on the environment.

Additional to the post processing effects, particle effects play a huge role while simulating realism, like dusts, flies and many more real-life visualizations have been used by developers to generate the atmosphere.

2.2 Audio

Many games have not given the necessary significance that audio deserves, but luckily with the evolving industry of game development, especially with first person shooter genre, the games have started to include top quality audio in order to implement the realistic atmosphere where the players wander around. With the enhancement in stereo audio technologies and recording hardware, games are now able to implement high quality audio with incredible algorithms to simulate the environment the player is in. One of the most successful audio implementations for the last decade has been made by Dice, in Battlefield 3, for creating an outstanding battle zone environment with all kinds of detailed audio from bullet shell drop sounds to sonic booming jet sounds.

2.3 Physics and Animations

When talking about accurate real-life representation, one must consider the behavior of physics in a game. Any specific game can implement its own physics rules that acts differently than our real-world physics, but still it doesn't mean that it overcomes realism. More about this confusing opposition will be explained later on this paper, but for now let's talk about real life accuracy of physics. Players expect any object in 3D game world to be affected by physics laws accordingly, and many game engines nowadays achieve this in remarkable ways. One of the biggest achievements in this field has been grabbed by again Dice, with Battlefield 4's Levitation system. Almost every object in 3D world is attached to a main controlling environment system, and almost every single block of a building is destructible (Figure 4) in an accurate responding way to the laws of physics. Even the waves in the sea are responsive to any object dropped on the surface of the water, and the whole 3D world is compatible with and responsive to environmental effects like wind or shockwaves. This has carried Battlefield 4 to completely new level of competitions in the market, due to its intense realism provided by its physics systems.

Figure 4: A dam, which was fully restored in the beginning of a multiplayer round, is being collapsed due to intense player (user) fire & actions. Battlefield 4.

As to go without deeper explanation, animations play a huge rule in order to achieve realistic visuals, especially in a first person shooter games. Not only character animations, but the weapon animations of the player play a huge role to pass the idea of realism into the players perspective. Since the weapons in first person shooter games are the objects that are constantly in front of the player camera, and overlaps a huge area in the screen space, they have significant impact on player about whether he or she perceives the game as realistic or not. The weapon animations like firing, reloading, inspecting, holstering etc. Has to be accurate, meaning the movement of the hand, including wrist and finger positioning and orientation, must be biologically and physically accurate to create the feeling of "being there". Additionally, one of the elements that play a huge role on realism is the camera animations. The movement of the camera while controlled character is moving, its sway movements and "kicks" when firing a weapon or receiving a fire have a huge impact. But, when inspected by considering "accuracy to real life", it's not accurate. Our head does not bounce while walking in real life, like it usually does in first person shooter games, neither we receive too significant upwards kick motion while shooting a firearm, neither if we get shot, unlike first person shooter games. Then how do these "simulation" of movement behavior achieve more realistic perception, even though they are not accurate with real life?

That is the "virtual realism" that was mentioned in the introduction part of this paper, and it will be explained later. So far, let's stick with the basic elements and outlines that "represent" realism.

2.4 Others

Many other shell related elements like artificial intelligence, or directly core gameplay related issues like main mechanics, can have significant impact on the understanding of realism. However, they are totally boundaryless and not necessarily linked with realism directly. For instance, our core mechanics might be revolving around the idea of gravitational warp in a sci-fi concept, and they might totally oppose the laws of physics. The artificial intelligence in a game might behave totally different from its real-life representing object. However, still they might be perceived as accurate and realistic. This has to do with flow and immersion, and again, this topic falls into the concept of virtual realism, and it will be inspected later in this paper.

3 Flow and Immersion

The idea of immersion is that when a player starts leaving the real world, and diving into the virtual world of the game instead. Slowly losing track of senses of time and surroundings, and deeply being involved, or "immersed" into the game world. This point is where the player is totally hooked up on a game and prioritizes virtual world over the real world, even for a short time. The flow is the idea and concept that drives the immersion, that keeps the player immersed into the game. Thousands of games have various different strengths and weaknesses, both over core mechanics or shell mechanics, throughout hundreds of different elements to transmit the idea of the game, whether graphics, audio, physics, storyline, mechanics, uniqueness etc. All of these games have one common point, which is to be fun, and to be playable. Many game studies and design researches conducted points about all these into one main goal, which is that the game shall be immersive. Whether the mentioned game is a role playing MMO game that consumes thousands of hours of players to maintain and progress, or a simple 2-dimensional multiplayer game where an average time of a round lasts only 2 minutes, the game can be immersive. The idea of the immerse is to take the

player out from the real world and transmit the mind into the virtual world, during gameplay time. The player is not supposedly "see through the character" or "to identify with the character", he or she is supposed to lose sense of time and self and completely focus on the task at hand, which is directed and delivered by the very game itself. One accurate definition of the topic can be: "The idea is just that a game creates spatial presence when the user starts to feel like he is 'there' in the world that the game creates" as described by Jamie Madigan in his analysis The Psychology of Immersion in Video Games.

4 Achieving Immersion

In order to fully understand how to accomplish immersion in a video game, one should first understand how are video games perceived by the player, in which ways does this perception occur so that the player will dive into the game world. This has a lot to do with psychology, as it was mentioned in the abstract section, specifically cognitive psychology. According to the studies, the process of creating immersion can be put into two main distinct categories: intense mental model of the game environment and consistency between elements over a game environment. For the first category, the word "intense" plays a huge role. It means that the mental model:

- Should be responsive to the sensory information that is being transmitted to the player during gameplay,

- Should be cognitively demanding,

- Should have a competing narrative to affect the motor cortex of the brain, especially during decision making parts of a game.

The responsiveness to the sensory information is all about how a player will be reading the game. It consists of multi-pass information channels, like audio and visuals. For instance, if the player is in a forest environment, having butterflies wandering around, casting bird and various other animal voices, seeing flies over the muddy areas would definitely compliment these multi-pass information channels, because they would make sense in that specific environment and they correspond to more than one sense. Also the responsiveness element

includes the completeness of sensory information, which basically means that the user should have less to fill in around the game world. On the event of a question raising about a specific flaw or defection inside the game world, in the players mind, that question shall be answered by the player automatically. For instance, think about a survival scenario where the player character is alone in the woods. If the player is supposed to find a weapon to challenge particular gameplay obstacles like enemies or puzzles, then when player asks "Why there is a fully loaded pistol on the ground in middle of nowhere?", he or she should answer the question immediately by themselves. Scattering a few corpses around the forest, preferably corpses with military suits or suits of some kind of a job that requires pistols, would solve this issue. The player who has seen dead people around would easily assume that the pistol he or she had found is totally normal to be there, because other people from military, police etc. Have been there and the pistol is most likely to belong to them. So there are no blanks in the players mind. The blanks intentionally placed by the plot is totally alright, as it is to be filled during somewhere in the game, but the blanks with unanswered questions that fall behind reasoning slices the completeness of sensory information, thus preventing the creation of a more immersive experience.

The mental model of the game being cognitively demanding means it constantly keeps the player's brain busy. Player is focused on the task at hand, and when that task is finished the game world should always make the player think about the events surrounding the world. So that the player has less chance to think about the real world, because he or she would be full of information about the game world.

Competing narrative, basically the plot of the game, shall have strong features so that it would complement the first two requirements for the mental model of the game.

Other category, the consistency inside the game world, is a self-explanatory category. It requires the game elements, from visuals to narrative, and details to be consistent with each other, so that the "flow" of the game will be kept over a particular limit, leading to more continuous immersion.

Of course, generating immersion through human psychology is a much more complicated process, especially in games. However, these are the basic methods and necessities to conduct a game process full of immersion, and more information, regarding game design and

narrative design shall be collected in order to successfully to do so. As we can interpret, the idea of immersion is one of the most crucial points to create a successful game. But, how is it related to realism? So far, we have covered the basic outline about how video games achieve naked realism through various elements, and what immersion is. Now it is time to combine these two concepts, to generate the "virtual realism".

5 Virtual Realism

The idea of virtual realism - not to be confused with virtual reality, nor the Michael R. Heim's book "Virtual Realism", even though it shares ideas in philosophical and psychological levels - is a concept that has been breezing around my head as a game developer for years. Without giving it a specific name, the idea has been studied by many game researchers and game study enthusiastic, as well as game developers for years, and have been achieved through various techniques throughout the years. As mentioned earlier, realism might have both positive and negative impacts on immersion. Virtual realism is the type of realism, that creates the immersion itself. It is the branch of design technique which creates consistency inside the game world to achieve immersion. It is the game being "realistic" within itself. As well as the realism section described earlier in this paper, virtual realism has its own various categories of elements that it can be fed to be implemented on.

5.1 Graphics

Many graphic elements, that are used to simulate virtual realism have been criticized by the players as if they were not "realistic". In fact, many studies and recent analysis that I have conducted with 30 participants, some elements may seem they are not directly related to realism, but they are helping to create a coverage balloon of ideas that help users to feel more into the game world itself. The results of the study will be given later in this paper, but for now let's have a look at some of these elements.

5.1.1 Lens Flares

Lens flares are both 3D object based and post process based effects that are used to simulate the bloom and flare effects through light sources (Figure 5-6).

Figure 5: Lens flares from the headlights of a car in Battlefield 4.

Figure 6: Lens flare from a light source in Fallout 4.

As can be seen from the images, lens flares can be quite unrealistic when focused on. In reality, our eyes might produce some light artifacts due to the ricochet of the photons while looking at high intensity bright lights, however most of the time these artifacts are ignored by our brain to have a clear image of our surroundings. When realized and focused, one might recognize these artifacts but the time of recognition will not be too long, as our brain will

interfere with the process and fill out the area of vision obscured by artifacts with digital information, thus achieving a clearer image. However, in most games, we are seeing these artifacts, in the forms of flares, and in high amounts. This is an issue where people have been debating about, that if we are the character inside the game, isn't it totally illogical to see those flares since our eyes wouldn't catch them like that in real life? Well, it is totally logical, and that's where the virtual realism kicks in. Yes, real eyes wouldn't catch them as they are in the games, but real-life cameras do. When taking a picture or a video from a digital lens, due to light scattering through the internals of the lens, these kinds of flares do occur in the final image. Now this raises the issue; "We are supposed to play the character and see through its eyes, and eyes still don't see those flares." And that's where the most players get the wrong idea on. We, as players, are never intended to "be" the character, we are always intended to be the "camera". It works just like in the movies, our perception of the game gets tunneled through the camera, which transmit the visual information of the character. Even though this seems like it abstracts the player from the character, it is actually what internalizes the player with the character. Seeing what the character has seen, and most importantly, being able to alter what character has lived through, using mechanics of the game. That is what creates the immersion, that is what takes the player from their own worlds into the game world, the idea of "being in control" of somebody else's "fate", which in the case of games, the main character. Thus planting the idea of watching and controlling a "camera", consciously gets well suited into the players' brain, and enables them to relate more to the game, even though it is not recognizable by the player in obvious sight. This is the virtual realism, using non-realistic effects and methods to create a "game reality" that the player can dive into, in the case of the lens flares, our reality is consisted of a character and a camera that records what that character sees, and cameras do generate lens flares. The same case with lens flares also goes with any kinds of effects on the 2D screen space.

5.1.2 Rain Drops

The same reasoning for lens flares, rain drops are used to create the virtual realism, thus improving immersion. In real life, when it's raining, we wouldn't see tens of drops of rain falling in front of eyes, however it might be seen if we recorded a video of a rain without

covering the camera lens (Figure 7). Thus, just like lens flares, rain drops help the idea of "watching" the surroundings through a god like controlling perspective.

Figure 7: Rain drops on camera in Duke Nukem Forever.

5.1.3 Blood Effect

Goes without explanation, this effect is used to simulate player character getting "hurt" (Figure 8). It is used on the camera to simulate the feeling that the character gets, as well as the idea of blood splattering from getting hurt, which can not be simulated in any other way than post effects, audio and UI.

Figure 8: Blood effects in Call of Duty 4.

5.2 Audio

There has been widely used audio effects that might fall into the category of unrealistic, however the same case for graphics goes for the audio too. In order to create the dramatic effect, just like in the movies, games do embed some audio effects in ways that wouldn't be hearable in real life. The biggest example can be given as the heartbeat audio effects when the character's stamina is drained or health is low. In those cases, player would be able to hear obvious and distinct heartbeat audio effect to represent how fast the character's heart is pumping. Again this aids the virtual realism, hooking the player into the game more and more.

5.3 Mechanics & Others

A game specifically doesn't need to have fully realistic mechanics to create immersion through realism. Actually, mechanics that are highly realistic fall into the category of simulation games, which has a very specific audience. Most hyper-casual and arcade players do not enjoy playing simulation games. Biggest example can be given as Arma series. It's a first person shooter military simulation series, and includes mechanics like dying only with couple of bullets from extreme bleeding, like in real life, doing nothing but only running for hours over a vast landscape to secure a rally point for an operation that the player isn't even involved, just like it would have been for the real life scouts in the military. Players looking for fast paced action and quick gameplay will definitely suffer from the extreme realism based on Arma's mechanics. However, in Call of Duty series, when player reloads its weapon, the ammo that was left on the dropped magazine gets transferred to the total ammo of the player, so the player never loses ammo when reloading is done while there were still ammo in the magazine. Totally unrealistic, but achieves the game's own reality effect. In Call of Duty universe, it is realistic for the ammo to gets transferred, because it's the part of the game mechanics that enables the immersion to continue. The players doesn't need to worry about ammo management, they only need to worry about shooting their targets. Again, this fits to the virtual realism accomplished by Call of Duty series, with millions of players world wide involved in the game world via high amounts of immersion.

6 Studies and Findings

In order to back up the ideas presented in the Virtual Realism section of this paper, here some experiments conducted with over 30 participants can be found and inspected.

6.1 Lens Flare and Post Process Experiment

I have developed a simple demo scene, from a first person shooter project I have been working on, to conduct a simple experiment with 30 participants. I had divided participants into three groups. Group 1 and 2 played the demo with post processing effects enabled (Figure 9), while the third group played it with post processing effects disabled (Figure 10). (Only bloom and lens flares) First group was asked questions about how "realistic" the effects were, whilst the second group was asked questions about how they were "hooked up", thus immersed into the environment of the demo they were playing. The third group was asked the same question as the second group, but they played the demo with the effects off.

Figure 9: *Post lens flare and bloom effects, which are considered unrealistic to the human eye, are on.*
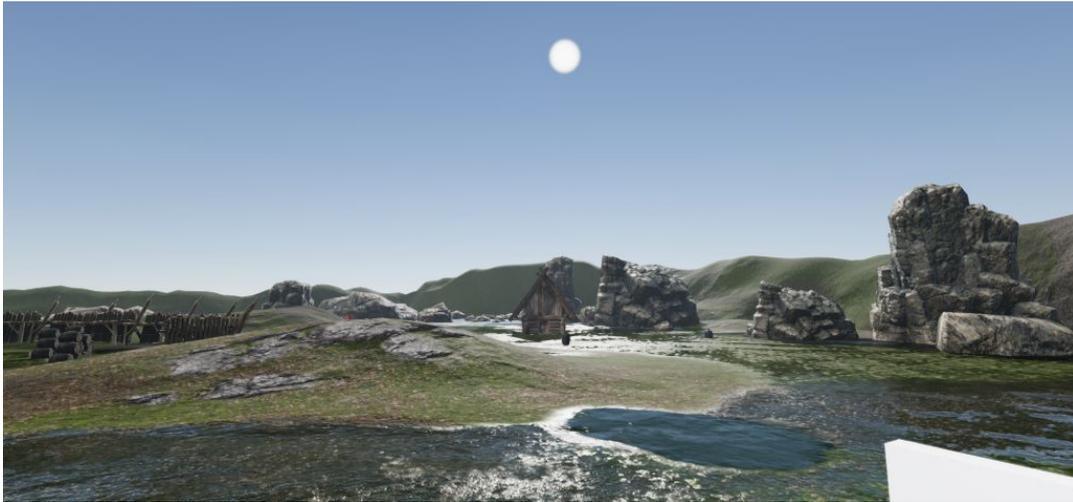
Figure 10: *Post lens flare and bloom effects are off.*

Below are the results for the conducted experiment.

Group 1

- 5 of 10 participants had rated the realism of lens flares and bloom 4 out of 10 (10 being the most realistic, 1 being the least).

- 2 of 10 participants had rated the realism 3 out of 10.

- 1 of 10 participants had rated the realism 2 out of 10.,

- 1 of 10 participants had rated the realism 6 out of 10.

- 1 of 10 participants had rated the realism 7 out of 10.

Group 2

- 6 out of 10 participants voted 8 out of 10 to the attractiveness of the atmosphere. (10 being the most attractive, 1 being the least.)

- 1 out of 10 participants voted 9.

- 3 out of 10 participants voted 6.

Combined Points: $6 \times 8 + 1 \times 9 + 3 \times 6 = 75$

Group 3

- 5 out of 10 participants voted for 6 out of 10 to the attractiveness of the atmosphere. (10 being the most attractive, 1 being the least.)

- 2 out of 10 participants voted for 5 out of 10.

- 2 out of 10 participants voted for 7 out of 10.

- 1 out of 10 participants voted for 4 out of 10.

Combined Points: $5 \times 6 + 2 \times 5 + 2 \times 7 + 1 \times 4 = 58$

Even though the source of experiment and the participant demographic was not sufficient enough and the scale of "attractiveness" is not a solely impactful reasoning for generation of immersion to conduct a scientific research material, however the experiment was still reasonable enough as a starting point for an idea. Most of the people who played the demo did not think that the effects were realistic, however we had observed higher results of attractiveness while effects were on and comments from the players that the game was more realistic. (Comparison of Group 2 with Group 3, Group 2 with the effects on won by 75 over 58 of Group 3.) The players have not even realized the "unrealistic" effects were creating the "realism" inside the game world itself, thus helping to build immersion via attractiveness.

7 Summary

In summary, the processes of achieving both immersion and virtual realism are highly interrelated with each other. Linking these concepts may be hard to conduct, but still is not impossible. There are many examples of this link being successfully done. Not only from the aspects like graphics, mechanics or audio that were mentioned in this article, but also with the aspect of narration. The biggest example of this would be the game called The Stanley Parable, that accomplishes virtual realism and high amounts of immersion, only through the narration and narration based level alterations. Another example for visual based virtual realism would be Superhot, which has totally unrealistic characters and untextured environments, however the harmony of visual effects and properly done lighting, which is totally unrealistic, creates a realism within the game itself, linking it with high amounts of immersion, causing the player to believe the game's own reality, backed up with a unique

gameplay mechanic. Many other games can be given as examples, which would not fit to realistic behaviors in the terms of physics, camera motions, artificial intelligence actions etc. However, those terms would be used to create the game's own feel and mechanism, rendering it in its own universe, thus generating its own reality. The point being made is, realism and replication of realism can be used to generate a virtual realism, a specified, altered and shaped form of realism that is unique to the game itself, which then produces immersion through its unique roots of realism.

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