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Stef Nicovich

University of Lynchburg, nicovich@lynchburg.edu

Jessica Scheld

University of Lynchburg, scheld_j@lynchburg.edu

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BlockChain Technology and the future of Video Games, Is Presence still Relevant?

Stef Nicovich, University of Lynchburg, nicovich@lynchburg.edu

Jessica Scheld, University of Lynchburg, scheld_j@lynchburg.edu

Abstract – BlockChain technology has grown exponentially over the last several decades. Early on, cryptocurrency presented a substitute for hard currency as a way to purchase goods and services. Recently, cryptocurrency has entered the video game world. How cryptocurrency, which has value outside of a video game, may impact the virtual reality world, is an open question. Presence, or the state of being in an environment, will be affected by the ability to escape within video games as cryptocurrencies are used. As video games often provide a place to escape the real world, bringing the real world into the game may have negative impacts. On the other hand, cryptocurrency brings with it another dimension. Video games are more and more realistic and including currency that has value in and outside of the game increases the realistic nature of the game. The way in which the inclusion of cryptocurrencies is marketed will have an important effect on the trajectory it takes. The blurred lines between reality and virtual will only continue to grow, and the effect on video games remain unclear.

Keywords – cryptocurrency, video games, blockchain, entertainment

Introduction

Presence as a phenomenon has been studied for over 20 years with an identifiable progression as to how the field has matured. Initial research explored the physical nature of what conditions were necessary to produce presence focusing on the physical representations of the experience such as vividness and interactivity. This soon segued into more of an exploration into the psychological understanding of what is to experience presence focusing more on the actual “being there” phenomenon experienced by people as they engaged in a computer mediated event. However, all the research done in this area to date has assumed that there are no consequences to the events that happen in a virtual reality experience. To paraphrase that famous Las Vegas ad; what happens in an MMO video game stays in an MMO video game. It is important to note that MMO (Massive Multiplayer Online) video games are games where players interact with each other in real time. They have traditionally been viewed as escape worlds that continue on even after the player leaves the game. However new technologies are allowing for more interaction between reality and virtual reality. In this paper, we will explore the use of BlockChain technology on MMO video games and its possible impact on presence.

The Conditions Necessary to Produce Presence

It is understood that three factors are necessary to engender presence. These factors are environmental fidelity, interaction and consistency of presentation.

Environmental fidelity has been conceptualized several ways and has been reported as the vividness (Steuer, 2000), quality (Usoh, Catena, Arman, & Slater, 2000), sensory factors (Witmer

& Singer, 1998), and sensory information (Sheridan, 1996) of the displayed environment. Environmental fidelity is the degree to which the environment is robust in its portrayal of the situation. It is not necessarily how realistically the environment is portrayed but with how much detail is presented. Physically this detail could be rendered with a greater number of environmental elements, better textures, and more fluid mechanics. Greater detail will give greater information to the participant and hence lead to a “more complete” world.

Completeness of representation, however, is only part of the necessary conditions. Being able to interact with the displayed elements is also necessary. Interaction is conceptualized as the degree to which the participant can modify the situation. Interaction factors have been reported in terms of the degree of represented interactivity (Steuer, 2000), interaction (Usoh, et al., 2000), control (Witmer & Singer, 1998), and modifiability (Sheridan, 1996). As such, in order to “exist” in a world one must be able to affect it.

Finally, the experience must be free of glitches and unexpected changes in the above elements, in other words the displayed environment must be consistent in how it is portrayed. Consistency of representation is the degree to which all sensory input remains homogeneous. As such, the degree of interactivity and the fidelity of representation will stay uniform. Inconsistent representational elements would remind the participant of the artificiality of the environment and in essence “break the moment.” Representational consistency has been reported in terms of the absence of distraction factors (Witmer & Singer, 1998) and consistency across all displays (Usoh, et al., 2000).

These early understandings of presence, however, quickly led to the realization that presence itself is more likely a psychological experience that is mediated by the environmental representation (Nicovich, 2012). As such, research in this area quickly looked to what it actually meant to “be present.”

Presence as a State of Mind

The general consensus of presence is that it is a sensation of “being” in an environment. (Heeter, 1992; Heeter, 2003; Lessiter, Freeman, Keogh, & Davidoff, 2001; Lombard & Ditton, 1997; Nicovich, 2012; Schloerb, 1995; Schlosser, 2003). Much of the early work on presence focused on this understanding. Lombard and Ditton (1997) discuss presence as the perception of non-mediation. They argue that the degree to which a medium can produce an environment that is accurate in its representations leads to an experience that seems real. Alternatively, Heeter (1992; 2003) defines presence as the process of discerning and validating the existence of oneself as part of, but separate from, the environment. The environment, therefore, must react to the participant’s actions. However, Haans and Ijsselsteijn (2012) argue that there must be a separation between environment and the perception of oneself in order for presence to be experienced. It is this separation that allows us to place ourselves into a surrounding.

Presence, however appears to be both more and less than the interaction of the represented environment and perceived being in that environment. Lombard and Ditton (1997) state that there are three places one can feel present, the natural world, the mediated world, and the imaginative world. If this is so, then presence is more than just the psychological reaction to environmental stimuli. For much of the work exploring presence, the idea that one must be paying attention is a key element. Lombard and Ditton assume this with their definition of the illusion of non-mediation. Heeter (2003) indicates this with her notion of self-understanding in an environment

and Klimmt and Vorderer (2003) take the approach that the experience is a result of interpersonal characteristics (motivation and memory) and experienced presence.

Our understanding of presence, therefore, is a collection of interacting elements. Essentially presence is a psychological reaction that comes about through an understanding of where we are in relation to a “space” or “environment”. This environment, however, must contain the elements necessary to engender this reaction.

Presence as a phenomenon has looked at the nature of “being” in an environment but it hasn’t explored the question of “why are we there to begin with?” In other words what is the reason for engaging the displayed environment? People (with very few exceptions) don’t end up in a CM environment by accident. The most likely scenario (and the one most useful to marketers) is that the interaction is voluntary and most likely anticipatory. To what end to we engage in a video game or virtual world? Is it to “get away” from our own existence? Or is it to “go toward” a different experience? Are we being drawn into another place or are we being pushed out of our own?

Realism vs. Escapism

Video games have been assessed with the nomenclature of escapism. They are categorized as such for two reasons. They are games and they are virtual. (Calleja, 2010). Games are designed to be artificial and separate from reality. The rules of a game are constructed and known to all who play. Games are designed to be inherently “fair” so that all who play have an equal chance of winning. The virtual nature of video games doesn’t help as a world is created that is totally separate from reality and can only be accessed through a screen and artificial controls. As such video games are viewed as separate and distinct from reality with their own rules that are largely arbitrary. This separation has been coined as “The Magic Circle” (Juul, 2005). As such Video Games are viewed as a means of transference from reality to virtual reality. When this transfer is successful we term that experience as presence. This can lead to certain behaviors that would be viewed as not appropriate in the real world.

While video games are seen as escapist and separate from reality there has also been a trend toward more and more realistic games. Games where the displayed world approaches photo realism and the interaction very closely mimics real world norms have become more common. Look at this image that traces the evolution of the Tomb Raider video games’ main character of Laura Croft. The below image traces the representation of the main character from the game’s introduction in 1996 to the latest iteration released in 2018.



<https://www.wallpapervortex.com/wallpaper-28396-tomb-raider-dual-screen-dual-monitor-lara-croft-graphic-evolution.html#XN7-AFNKjmE>

What was once an artificial blocky characterization of LC has morphed over the years to someone who practically looks real. Additionally, new raster display techniques are producing hyper realistic worlds such as these game shots from Star Wars Battlefront.



Even after close examination it is difficult to tell that these are game play renders and not photographs. This quest for realism of display can also be seen in Nvidia's latest RTX graphics cards. RTX stands for ray tracing. Ray tracing calculates all the light paths from light sources for superior shadows and depth. Ray Tracing is seen as a superior way to render hyper realistic games.

However, the quest for realism is not limited to just the display of the presented world. Gameplay has also seen a trend toward greater mimesis and a greater reflection of the real world. This trend can be seen in hyper realistic physics engines of many RPG and MMO games. Physics engines can now model damage sustained by the environment and characters. Crumpled fenders in cars and reduced mobility in characters as a result of damage is now common. Perhaps the most indicative of this trend is the "ineed" mod for Skyrim (Nexus Mods, 2019). With this mod characters need to eat, drink and sleep regularly in order to keep up their strength. Additionally, it has a food spoilage feature so that food that you have in your inventory will spoil if not eaten in time and if you don't keep your strength up you become more susceptible to diseases.

So, what will the future of video games be? Will these two forces of escapism and realism continue? We think we have an indication in the form of BlockChain technology and its impact on video game design. Recently two MMO's have announced economies based on BlockChain technology. Both the games "Ember Sword" and "Parsec Frontiers" have announced that they will be using the BlockChain technology behind the Ethereum cryptocurrency. Ember Sword (2019) appears to be aiming for a "Second Life" (Lindin Labs, 2019) type of experience where players more or less live a second life in the world complete with land ownership and generated economic activity. Parsec Frontiers (2019) appears to be more of a "conquest of new lands" kind of experience. However, both games state that currency in the game will transfer to currency out of the game. It is this currency transference that is at the heart of these two endeavors. Now for the first time in game wealth will transfer to out of game wealth without an artificial exchange rate as set by the game developers, as was the case with Second Life. In order to understand how this would work, an exploration of currency and value is required.

Value and Currency

Currency has existed within economies for centuries, ranging from shells to beads to coins to paper money. Early on, trade, or bartering occurred between two people when both goods had value to the traders. For example, if one person raised cattle while another raised chickens, these

people would find an agreeable exchange rate for cattle and chickens based on their valuation of cattle for chickens. This bartering system evolved into currency, which allowed for acquisition of goods without requiring two parties desiring goods or services from another. Rather than bartering, money provides the mechanism to facilitate trade (Lewis, 2007, Kinley, 2001). This ability of money to be a medium of exchange is one of the three major functions of money, and an advantage over the bartering system. Without money, all transactions would require exact exchanges of goods and services, which is both difficult and time consuming. All forms of money serve three major functions: a store of value, a medium of exchange, and a unit of account (Jevons, 1896). Money serves as a store of value because it will hold its value if saved over time. In other words, money is expected to have purchasing power in the future. Wealth includes all assets of value (for example, homes or stocks), but cash money additionally has liquidity, which aids in its value. Although inflation deteriorates money's purchasing power, it is better than storing value in a perishable good, or a good with high volatility. As a unit of account, people understand what a good or service costs when it is quoted in terms of dollars, but goods can be sold in terms of many items: cattle, corn, gold, etc. Money is recognizable in that people are easily able to identify relative values of different goods and services.

The idea of a centralized banking system is ingrained in American culture. Since the Great Depression, we have had a banking system that revolves around a central bank; one that instills trust and provides a place to deposit and borrow money. Dollars deposited or spent are backed by the U.S. government. Since that time, we have moved from the gold standard to a fiat currency. The gold standard was an example of representative currency. Money can take several forms. Commodity money has intrinsic value (for example, gold) and representative money can be exchanged for something of intrinsic value, (for example, the gold standard) but both are backed by something of intrinsic value. Under the gold standard, you could trade your dollar for gold at any time, but transporting a certificate of value was easier than gold bars. Commodity money, like gold or silver coins, held their value intrinsically. This made valuation easier, but also allowed for manipulations such as the clipping of coins to use the metal. Fiat money is currency that is not backed by something of value, like gold. It is instead backed by the US government, and is only valuable because it is deemed legal tender (Mankiw, 2007). Money additionally has several helpful characteristics, durability, portability, divisibility, acceptability, uniformity, and it is difficult to reproduce (Dinu, 2014). Dollars are durable - when a dollar bill wears out, it can be reprinted. Dollars are portable - it is easy to transport a stack of bills, as compared to a comparable amount of gold coins. Dollars are easily divisible - while you can break a \$20, you can't so easily cut a gold coin in half or trade for half of a cow. While more gold can be mined and cows can be mated, the Federal Reserve controls the amount of money in circulation, creating scarcity. Deliberate money supply adjustments allow the dollar bill to retain its value. Money is accepted anywhere - other countries will accept an exchange for dollars, and every business certainly accepts cash. Not every business would accept gold or cattle for trade. Money is uniform - each dollar is minted identically. Even under perfect circumstances, it is easier to mutate coins. Every cow is different. Money in its current state is the ideal form of currency that digital currency is now trying to emulate.

Cryptocurrencies have recently developed as a new form of money. Bitcoin originated in 2009, and became the first digital currency, quickly followed by many others. One major hurdle of digital currencies before Bitcoin was creating a safe means for transactions. These new currencies use BlockChain technology to achieve this. A block chain is a list of sequential transactions, providing a digital ledger available to anyone, and removing the need for a trusted

third-party, decentralizing currency (Blockchain, 2019, Böhme et al., 2015, Demertzis & Wolff, 2018). Block chains are updated by miners, who are rewarded for their efforts both in bitcoin (until they are capped), and in transaction fees paid by users (Böhme et al., 2015). Bitcoin is easily portable, durable, divisible, and uniform, making a strong argument towards treating it as currency. Bitcoin's value, or the exchange rate between bitcoin and other currencies (digital or otherwise) is determined by supply and demand in the market (Dinu, 2014).

As it derives its value from those that use it, bitcoin and other digital currencies are a form of fiat currency. However, the US dollar, as fiat currency, is valued through the US government and the Federal Reserve. Dollars are backed by the government's promise that they will retain value. Bitcoin does not have this property, and thus does not fill the definition of fiat currency. To retain value without a central bank dictating its value, digital currencies impose scarcity. Limiting the supply makes digital currencies similar to commodity money in that there is value in the limited quantity of it. Selgin (2013) calls digital currency "synthetic commodity" currency, as its usefulness is monetarily and has no intrinsic value, but is scarce in absolute terms.

Value and Scarcity

Scarcity is a requirement of any asset, as its value is derived from a combination of scarcity and utility. Utility is important to any currency, as money that doesn't provide increased utility for its consumers is of little importance. Scarcity provides stability in prices and limits the growth of the money supply (Böhme et al, 2015). In traditional currency, banks or financial institutions keep records of debits and credits to keep ledgers accurate. The central bank controls the money supply, either by increasing the money supply to combat a recession or by restricting money supply to fight inflation. Digital currencies avoid all of this via the peer-to-peer network and BlockChain technology. Bitcoin's are released in pre-determined amounts and times, and induces scarcity by restricting the total amount in circulation at any given time. This method follows Friedman's (1960) proposal to increase the money supply at a fixed rate, or the "k-percent rule," until the last bitcoins are released. That bitcoin will eventually have an upper limit to the amount in the economy induces scarcity. Restricting supply by definition will increase the price, or value of the good. Keeping the supply inelastic however, could potentially lead to deflation, which would potentially increase interest rates and volatility (Dinu, 2014).

Using a cryptocurrency would allow game players to connect game life with real life and thus separate game from the gaming company (via taking money out of the game). What is more interesting is that the use of a cryptocurrency would separate the value being exchanged from the developers of the game. This would allow for true ownership of assets in a game.

One major drawback is timing; Bitcoin technology cannot operate in real time the way traditional financial transactions can and this limitation restricts the ability and use of digital currencies in video games. Bitcoin currently manage about 390,000 transactions per day, whereas Ethereum manages 930,000 (Blockchain, 2019). Some newer cryptocurrencies are exploring other options with respect to increasing transaction speeds, such as replacing proof--of work with proof-of-stake (Böhme et al., 2015) or the Lightning Network. However, the additional security and reduced ability to cheat may outweigh the negative of slow transaction times.

The Future of Gaming; Research Questions

As we have discussed, the use of BlockChain technology in video games will record the value of economic transactions within a game that will then have value outside the game. However, this is a paper on presence, and it is now time to discuss the impact of possible real-world consequences on presence. The simple answer is that we don't know what the impact will be as it has not really been studied before. However, if we explore this situation logically and use the definition that presence is the appearance of non-mediation (Lombard & Ditton, 1997), or to put it more basically presence is the appearance of reality, one would expect the reaction to events with real world consequences would be the same as if they were experienced in the real world. However, this perspective ignores the escapist element of games. In games we can do things that we can't (or shouldn't) do in real life. The rules are set out beforehand as to what is permitted and desirable. These rules may not correspond with the rules of our daily lives. The blending of real world and fantasy worlds may have unpredictable consequences on how players interact with the game. However, this perspective is limited to monetary gain and loss via blockchain value transference, what if we broaden out our understanding of what blockchain technology is capable?

Blockchain technology can control for much more than just currency. Through the use of smart contracts and smart assets blockchain technology can actually control an entire economic ecosystem. Smart contracts allow for certain results to trigger automatically once certain conditions have been achieved. For example, in a game, once a certain quest has been fulfilled then the rewards of that quest would automatically be awarded the player. What is more the value of that reward may flex as the economy around it grows and shrinks. This brings up the notion of smart assets. A smart asset is a thing (as opposed to a denomination of currency) that has been developed that is associated with a block on the chain, such as a sword or magic spell (or a car in real life). This would mean that via the blockchain ledger there could be a finite number of smart assets in the game that are made up of other "raw materials" that are also part of the blockchain. In this manner a virtual economy could then be subject to the same restrictions as a real economy. The restrictions of scarcity and utility as the main indicators of value could then be modeled.

Would the introduction of scarcity be a welcome addition to the game or would it make the game seem too much like the real world? It would be very "real world" of a game for a player to finish a quest only to find the treasure chest empty as it had been already looted by the last person to finish it. Or, would the players perception of the adventure be altered if they needed to finish the quest so that they could then use the reward to help pay the rent that month? Would their earnings be taxed? What about remaining assets after a character dies? Would that increase or decrease (or otherwise alter) their feeling of "being there." If the context of the game has too much overlap to the real world would it be a more desirable place to spend one's time? As such we propose the following four research questions:

- R1: *Is there a fundamental difference between "being there" and "feeling like you are there?" In other words, is presence really a perception of non-mediation or does it consider the transformation from one world to another?*
- R2: *Would real world impact of my decisions alter my perception of being in an alternate world? Would I feel more present looting a dragon's chest if I needed to use that money for a car payment? Would that reminder take me out of the moment or would it amplify my experience knowing that the results would follow me out of the game?*

- R3: *Does our understanding of presence need to be expanded to include the impact of real-life context and situation? Would I feel more present in a situation where I am walking down the streets of New York City (of which I would have some previous experience) than I would walking into Mordor? Would I feel more present if there was an active story impacting my experiences?*
- R4: *Is there a fundamental distinction between gaming and gambling? Are video games (as in the MMO's explored here) different from tokenized games that simply allow for virtual winnings to become real winnings? Does the context of the event impact the nature of the interaction?*

Conclusions

It was inevitable that eventually we would figure out a way to blur the lines that have traditionally separated video games from reality. Video games have traditionally been viewed as a different kind of game, one whose presented artifice is quickly vanishing. Soon games will be all but indistinguishable from reality. When that happens will the phenomenon of being present go away, will it be amplified, or will it still exist as something else? Or will a fantasy experience that is so real suck us into an artificial world that is more important (both socially and economically) than the real world? Would that artificial world become more important to the players than the real world? Many science fiction writers have penned worlds where fantasy is more important than reality wherein they explore the (almost always) detrimental effect on society. Apparently, the future of videogames is both enticing and terrifying.

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