The Virtual Experience: Understanding sensemaking and user experience in virtual reality gaming

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Abstract & keywords

Introduction: The purpose of this study was to conceptualize the gaming experience in virtual reality to understand the sensemaking behind virtual reality. With virtual reality rising in the ranks of new media technologies, and the socio-economic value of video games at an all time high, this study aimed to propose a way of studying user experience in virtual reality gaming from a qualitative point of view. At the core of this study sat the conceptualisation of virtual reality sensemaking, identifying important topics of VR experience, and relating these to various degrees of immersion.

Method: A qualitative research approach involved experiential interviews with 10 participants on a university campus. Participants engaged in 20 minutes of gameplay and took part in 40 to 60 minute interviews in the aftermath. Interview audio was transcribed and and coded according to the explorative approach of grounded theory.

Results: The study identified three important themes in the data which further aided in making sensemaking measureable. Sensory meaning, narrative meaning, and virtual meaning emerged as concepts reflecting how players first and foremost rely on the physical side, the story elements in relation to one's own identity, and the design of the virtual environment in order to determine how meaningful the experience is to them. Combined with three stages of experiencing virtual reality gaming: the schematic experience, the filtered experience, and the emotional experience, a conceptual model for VR sensemaking was proposed and related to experiencing immersion, presence, and flow.

Conclusion: Virtual reality gaming can be made sense of as a multi-stage experience in which conceptual notions of sensory, narrative, and virtual meaning emerge as a result of the player's subjective needs, and how the characteristics of the experience can fulfill those needs. This then sets the precedent for the player experiencing a sense of immersion, presence, and/or flow.

Keywords: Virtual reality, video games, user experience, sensemaking, new media

Preface

I hereby express the utmost gratitude towards the lecturers of the Media & Business program whose courses I followed. It is the knowledge I took away from those many classes that inspired me to the work presented in this master's thesis. That gratitude I would like to extend to Dr. Abby Waysdorf, for providing me with the freedom to determine the course of my this while still making sure I did so professionally.

I dedicate this thesis to my parents, siblings and partner for always believing in my abilities. For providing me with clarity when needed over the course of this master's program, and simply for all of you being you. My closest friends I dedicate to for continuously telling me I was almost there and providing laughter when most needed.

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1. Introduction: Understanding the process that is virtual reality

The Guardian published a lengthy article heralding a new age of virtual reality technology (Redge, 2016). Profiling major developers names such as Oculus and HTC, and also giving various examples of how virtual reality was rapidly gaining acceptance in different corners of the Western economy. The gaming demographic was described as the primary audience for these ventures as the gaming community was claimed to be the most understandable and accessible entertainment demographic. Indeed, virtual reality as a technology is gaining momentum, and most certainly with regards to video games. The fast-paced development of technologies that are inherent to today's digital age has ensured that a technology which originated in the 1960's is now designated as an innovative field in media production. What characterizes virtual reality, often times referred to as VR, is interactive media content experienced through a head-mounted display (HMD) which places the user within an immersive virtual 3D environment. The shift from VR as a traditionally stationary medium now being supported by mobile devices has also rebranded it as economically and socially accessible to audiences previously disconnected from gaming consoles. In turn, popularity around virtual reality has risen along with products tailored towards said popularity, be it for leisure purposes or formal practices.

Apart from gaming, VR has In the last two decades in been used in areas such as the therapy treatment (Garcia-Palacios, Hoffman, Carlin, Furness Iii, & Botella, 2002), as an educational tool (Freina & Ott, 2015), and marketing areas such as tourism (Tussyadiah, 2018). Given that virtual reality is by definition immersive in how it physically isolates players from their surroundings, it is understood that consumers are fascinated at the opportunity to experience media in a way that adds another dimension on top of the usual video gaming setup: including the player, the console and a means of controlling the game. For developers, this added dimensions broadens the horizon of how stories can be told and most of all impact. If virtual reality lives up to the buzz which currently surrounds its name, the medium could serve as the next frontier in gaming in the digital era. What isn't understood is how players experience the added depth of virtual reality gaming as opposed to generic gaming experiences. Research on gaming has devoted a fair share of academic attention to the (user) experience in games. While these studies form a basis for detailing VR gaming experiences, the impact of 3D immersion alongside motion-sensitive play controls is not considered.

1.1 Scientific and societal relevance

But why is this researching the VR gaming experience a worthwhile topic? The studying of video game interaction is relevant as a result of video games being culturally and economically relevant on a global scale. In 2017, the video game industry was worth 76,61 billion dollars globally (Statista, 2018). The entertainment medium has come a long way from being met with hostility resulting from mental health concerns through the last three decades of the previous century, where a thriving culture surrounding video games has embedded itself in society by now (Shaw, 2010). The convergence of highly-skilled gamers and corporate sponsors has resulted in electronic sports, or Esports, where participants are eligible to win grand prizes (Seo & Jung, 2016). Often times these winnings can range between the tens of thousands to millions of dollars. Then there is the current trend of gamification, where elements of game-design are embedded in corporate marketing and advertising ventures (Deterding, Dixon, Khaled & Nacke, 2011). It is the established position of video games in today's society that make a robust understanding of the gaming experience important as virtual reality too move towards similar acceptance.

Especially because video games have such an established position in the digitized society, it is important to understand the understand the characteristics that make up the gaming experience when the dimension of virtual reality is added. In a 2014 post on his own platform, Facebook CEO Mark Zuckerberg announced the acquisition of pioneering VR developer Oculus. While he promised many exciting things to come for the gaming community, he ensured gaming was only the start (Zuckerberg, 2014). Virtual class lectures and doctor appointments with HMD were a few of the ambitious examples. And rightfully spoken, he said that VR was once a dream of science fiction, but that the internet had been too. Indeed, a growing amount of both consumers and producers of media content recognize VR for the possibilities the medium holds. The field of game studies remains relatively young (Möring, 2009), while the gaming industry develops at a rapid pace.

Developing an understanding of the sensemaking process in a virtual reality experience now will benefit academia when the absence of VR becomes unthinkable. Therefore, the development of a framework that can measure the characteristics of this sensemaking process forms the core of this study. Such a framework should then not only be applicable to virtual reality as a gaming medium but with future innovations in mind serve as a reference for analyzing virtual reality experiences in all forms of application.

In order to fathom the nature of the subjective experience an approach that covers the need for in-depth knowledge on the topic is required.
In order to meet these needs, this study takes a qualitative approach to the problem and thereby emphasizes identifying the VR sense-making process from a user point of view. Theory was drawn for game studies, media studies, but most certainly also from the more technical field of study in which the concept of user experience originated bears relevance in this research. User experience (UX) denotes the idea of evaluating the traits of an interactive system so that developers, in turn, can optimize these traits for the sake of effectiveness, productivity, and satisfaction in what is called usability (Bevan, 1995). However, this concept from the field of human-computer interaction (HCI) is aimed more at the evaluation of product quality than measuring the subjective experience of the user. Player Experience (PX) and Playability are the augmented answer to user experience research being adapted to the evaluation of video games (Sánchez, Vela, Simarro & Padilla-Zea, 2012). These research areas provide an initial glimpse into important that count as important when considering the subjective gaming experience such as presence, immersion, and flow. However, scholarly works on user or player experience fail to go beyond proposing research towards the improvement of product quality by looking at the meaning of such an experience beyond the surface level. In approaching the issue of deconstructing the subjective VR process of experience this study further draws theory from the scholarly work on the new media technology reception. Ultimately, this presents the research question of this study as follows:

RQ1: How do players make sense of a virtual reality gaming experience, and how do key traits of such an experience relate to degrees of player immersion?

1.2 Overview and purpose of the study

Formulating the answer to this research question will require definitions of experience in order to convey a concise meaning of an experience, user/player experience, and gaming experience. In addition immersion, presence and flow require defining as go-to concepts in measuring subjective immersive experiences across media, VR, psychology, and technology studies. Furthermore, there is a need for a clear definition of virtual reality. Such definitions will be presented in the next chapter by reviewing previous work on these concepts. The most relevant theory and models from these reviews will be used in the process of operationalization that follows in the chapter that follows after. In addition to operationalization, the chapter will justify the chosen methodology and sampling methods

opted for in this study, as well as justifications for the chosen theory supporting the analysis stage of this study. The results section will present a robust explanation of the theoretical model devised by the researcher of this study and its applicability in the context of virtual reality experience. The steps taken in identifying these findings will then be critically evaluated in the concluding chapter that follows while not excluding suggestions for future research in this area.

Considering the frame of time and resources in which this study was conducted, it is worth noting that the purpose of this study is not to present an indefinite framework for the analysis of virtual reality experience. Rather, this study adds a proposition to the relatively new research areas of experience in game studies, virtual reality and new media technology at large to highlight their importance in a time where they are more relevant than ever before in understanding the implications of humanity's interaction with digital media in a social, cultural and economic context.

2. Theory

2.1 Experience, experiencing and and experience

Experience is without doubt subjective. It's essence is that of meaning making, whereby the individual considers what is experienced and develops an internal reaction to what is experience. The Oxford Dictionary (Experience 2018) defines experience as an event or occurrence that leaves an impression on someone. This definition points to the idea that experience are an everyday, if not constant phenomenon. Dewey (2005) enforces this notion but distinguishes between experience in the general sense and its demarcated form that is *an* experience. He described the constant form of experience as being embedded in the very process of living, involving resistance and conflict, elements of the self and world which qualify experience with emotions and ideas that give it meaning. Consequently, conscious intent then emerges. In addition, an experience is a singular entity within that continuous flow of general experiencing, characterised by the material making up the experience having a conclusion (Dewey, 2005). All that is experienced outside of that temporal frame cannot count as part of that particular experience, as the experience has already passed. It is within the moments of active experiencing where sensemaking takes place.

2.2 Sensemaking

In relation to definition of an experience, sensemaking can be defined as the process of assigning meaning to what is being experienced. This process is selective. Chia (2000) metaphorically described the notion of perceived reality as a brute given substance by an undifferentiated flux of fleeting-sense impressions and out of this brute of lived experience, human attention carves and conception names. His presented description of the sensemaking behind a perceived reality points to the selective nature of the process wherein specific parts of what is seen are given attention after which they are given labels of meaning. This proposition is equally applicable in context of perceiving virtual reality. The player is overloaded with various forms of sensory information and will have preferences towards which aspects they will devote attention and thereby rate the experience as fun, frightening, dull, et cetera. Wieck, Sutcliffe & Obstfeld (2005) present a similar idea and propose sensemaking is defined by the relationship between enactment and ecological change which steers selection and results in retention. In other words, the actor, influenced by external factors such as social interactions, structures a list of possible scenarios of meanings from the flux of continuous experience. Their knowledge and presumptions lead to

the selection of a specific scenario and they pursue the outcome. This experience then gains the bulk of its meaning retrospectively as the actor consults the experience in a future situation of relevance.

Consider the abstract explanation as applied to the pursuit of this study. A fantasy-themed virtual reality game requires the player to fish from a teeming river containing regular, golden-scaled, and black fish. Given little context other than the explanation that some fish will be more beneficial to the player's health than others once he prepares them as food, a multitude of possible outcomes lie before him as fish are continuously carried on by the stream of the river. It could be safe option to catch the regular fish, but there must be a reason for fish of differing colours being present. He also considers the context of the situation: the fact that he is playing a fantasy game, and his existing interpretations of colour. Gold is often used to represent prestige whereas black, especially in the presence of gold, has a good chance of being a potential detrimental health option. His carrying out of selection will result in retention one way or another depending on the implications of his decision. After all, the interaction between the steps of the sensemaking process will only be retained or consulted if the relation between a decision and outcome is both believed and doubt in future referencing (Wieck, Sutcliffe, Obstfeld, 2005). The golden fish may be beneficial during one experience, but very well be indicated as a trap in the next. Douglas and Hargadon (2001) refer to the notion of retained experiences as schema. Schema are considered to be those internal properties humans reach out for when encountering mediated experiences. From this theoretical perspective, any encounter is simply an encounter until the individuals consults his or her schema to place said encounter within perspective of previous, comparable encounters. Users fully unfamiliar with gaming in a virtual reality setting, but familiar with gaming on console platforms will consult their experiences with the latter to determine their needs and expectations for the former, and so forth.

Within the scope of this study it is essential to understand the ways in which the sensemaking process has been defined in earlier works. They present a general overview of how sensemaking is done, and also contribute in understanding how less phenomenological approaches to experience research contribute to the present study, such as user experience and player experience.

2.3 Understanding user experience

Within the scope of this study it is understood that user experience studies focus almost exclusively on evaluating mediated experiences towards a purpose of designing media

applications to be evaluated for being as productive and positive in usage by the user as possible. However, such works have over time developed a trend of evaluating the role of important (subjective) traits in the assessment of the user experience. A concise definition remains contested, but at the heart of user experience research lies the relationship between the user and the interactive product or service.

Hassenzahl (2013) defines the user experience as a momentary, primarily evaluative feeling, be it good or bad, while interacting with a product service. He adds that such a definition moves the focus of the concept from the materialistic side, such as content, to the subjective interpretations derived by users in their interactions, with an emphasis on feelings. It can indeed be argued that the very presence of digital technology traits such as content and physical equipment should indeed play an important role alongside the subjective in assessing the user experience. Hassenzahl & Tractinsky (2006) define user experience as a consequence of one's internal state, the characteristics of the designed system, and the context in which the interaction takes place. Internal state refers to the to traits like the user's predispositions, expectations, needs, motivation and mood. Characteristics of the designed system refer to traits like complexity, purpose, and usability. Thirdly, context encompasses the environmental aspect of the interaction; such as the meaningfulness of the activity, or whether the setting is formal or informal. These initial stances towards

Theoretical trends exist in the field of human-computer Interaction studies for approaching the user experience and the weight of the facets making up such an experience. Kuutti (1996) proposed the thought of Activity Theory in deconstructing how the user makes sense of the experience. He claims that the user is not an isolated mind purely acting on the internal traits of humanity, as the internal cannot exist without the effect of the external, and human activity consequently existing as a result of internal and external traits influencing one another. Arguing such agency is also in line with previous definitions of sensemaking, in externalities exert influence on the perception of experience, but also the actor's selection.

According to Forlizzi & Battarbee (2004) experience can be measure by three types of models; product-centered models, user-centered models and interaction-centered models. Theoretical ideas categorised as product-centered models are primarily related to product design in the sense that they often come in the guise of checklists and topic lists relevant for UX designers reaching for product improved. The user-centered models are tailored to designers researching the audiences using their products. The perspective focuses primarily on the user's motivations and actions during an experience and thus, like product-centered approaches, evolves more around the what and why of the user experience than the how.

As Forlizzi and Battarbee (2004) point out, an interaction-centered model focuses on the experiences between the individual and the product, and the experiences that result from that interaction. Wright, Wallace & Mccarthy (2008) adopt such an approach in their work and highlight the multi-faceted nature of the user experience. They state that an experience is constituted by what the user brings to the interaction and what the designer leaves there.

2.3.1 Usefulness of user experience in a gaming context

There is an evident pattern between different user experience studies regarding traits considered to be essential in shaping the experience. However, Ijsselsteijn, De Kort, Poels, Jurgelionis, & Bellotti (2007) criticise the traditional UX approach for being insufficient in studying the experience in a gaming context. End goals such as productivity do not apply, and outcomes such as satisfaction also fail to encompass the fact that the activity of playing a video game itself already counts as a satisfactory reward to the player (Ijsselsteijn et. al, 2007). Secondly, it is also noted that basic user experience metrics contradict certain video game traits, such as obstacles purposely being placed in video games, and rich graphics serving a purpose of fostering more engagement as opposed to functionality. They rightfully propose different metrics to measure experience in a gaming context, referring to flow and immersion for future considerations. This criticism points in the direction of video game studies and virtual reality studies, where flow, immersion and also presence have been central topics in video game sensemaking and even virtual reality.

2.4 User experience: varying states of immersion

2.4.1 Immersion

In essence, the concept of VR translates into mentally transporting the user into the virtual world while they are not physically there (Rebelo, Noriega, Duarte, & Soares, 2012), commonly referred to as immersing. However, even a general term such a immersion which is also used outside of the academic context is a highly debated concept in virtual reality studies in absence of concise definitions and variants that include terms such as presence and flow too. Immersion and presence are considered one and the same by some researcher, or subtly distinct by others. In all cases their definitions revolve around different forms of making sense of the virtual world, but on the basis of different conditions.
Slater & Wilbur (1997) draw the line between immersion as *“The extent to which the computer displays are capable of delivering an inclusive, extensive, surrounding, and vivid*

illusion of reality to the senses of a human participant.". The inclusive, extensive, surrounding, and vivid aspects serve as metrics to the extent in which the physical reality is shut out, the range of sensory stimuli, the extent to which the virtual reality is panoramic, and the visual quality of content such as content richness, and display resolution. From this point of view, it is suggested that the design qualities of the virtual experience are responsible for the extent of immersion of the player. Gutierrez, Vexo & Thalmann (2008) followed this approach and identified three levels of levels of immersion based on the technological setup used to experience VR. According to their study, the HMD provides virtual reality as fully-immersive; projection screen-based VR such as the CAVE (a room in which all surfaces are covered by VR screens) setup reaches the semi-immersive level, while desktop-based VR creates a non-immersive setting. This is in line with the idea that the degree of isolation from the physical world is synonymous to the level of immersion.

However, this simultaneously suggests that technological sophistication is largely responsible for immersing in the VE. The better the equipment, or the better the quality of virtual reality design, the higher the extent of immersion. McMahan (2003) argues that such a notion foregoes the extent to which other user traits exert influence on user immersion in during the virtual experience. Instead, she suggest that three additional conditions determine immersion: The first stating the user's expectations of the virtual environment match the actual virtual environment closely. Secondly, the user's actions in the virtual world must be non trivial and thirdly, although fictional, the perimeters of the virtual world must be consistent (McMahan, 2003). The relevance of these additional conditions can be paralleled to user need for interactivity, as well as a degree of realism to make the virtual environment relatable.

2.4.2 Presence

But what conditions set presence apart from immersion? Presence is considered a state of conscious that, unlike immersions, is not quantifiable and occurs when the player experiences the virtual reality as more engaging than the physical world (Slater & Wilbur, 1997). This results in the player feeling *present* in the virtual environment, considering the virtual landscape as a location visited as opposed to simply watching realistic images. Across virtual reality studies, presence is frequently considered as the strived-for state of conscious during a virtual reality experience (Murray & Sixsmith,1999). Taylor (2002) considers presence a social phenomenon intrinsically tied to the representation of self in the virtual world. In his work on the role of the avatar in multiplayer games, he argued the avatar as the virtual counterpart to the player's real life identity of self. The player's ability to

practice real world social behaviours through their avatar, such as hostility or affection, was reported as triggering emotional reactions in players on the receiving end (Taylor, 2002).This instance of presence suggests the avatar, or virtual body as an important determinant in making sense of the virtual environment. Notable is that the players in the Taylor (2002) study reported on their experiences with a two dimensional cartoon game that should classify as non-immersive according to the three immersion levels by Gutierrez, Vexo & Thalmann (2008). This could suggest that presence can manifest independently from the conditions of immersion. On the other hand, it potentially identifies socialization as a powerful condition for presence regardless of the medium. Either way, it raises presence as a multi-faceted construct of which the conditions are ever changing depending on the traits of the virtual environment and the player who experiences. But considering presence as a state of conscious, this points to its subjective nature in which the player's sensemaking determines whether or not the overall virtual experience can ignite a sense of 'being there'.

Returning to the Slater & Usoh (1993) also experimented with this notion of 'virtual embodiment' by conducting that the virtual environment is to be responsive to the actions of the user, and suggest that the "virtual body" through which the user "lives" the virtual experience, must be rather similar to the user's actual body. This argues a recurring demand for realism in both immersion and presence in which the sensory cues of the virtual experience set a precedent for the player envisioning themselves within the virtual environment. On the other hand, studies have also shown that unrealistic player bodies have fostered virtual embodiment has been suggested as being due to the malleability of human body perception (Murray & Sixsmith, 1999). Preferences towards bodily representation in a virtual experience may vary from player to player. Shin (2018) counter argues the tendency of virtual reality studies to relate presence and immersion too closely to the technological traits of a virtual experience. Studying the reception of narrative in virtual reality experiences, he raised the user's cognition as a primary tool between the pragmatic characteristics of the virtual experience, and the way these characteristics can result in presence, immersion, embodiment and flow. In his words: "*Users actively create their own VR, based on their understanding of the story, their empathic traits, and the nature of the medium. In other words, VR developers propose immersion but users process it, based on their own preferences and needs.".*

It becomes apparent that without the unique traits of the user it becomes nigh impossible to have an experience. A virtual reality experience is then the result of a duality between the input of developers and users combined. The HMD and other hardware paraphernalia, the designed content providing a virtual environment of a certain standard,

and in certain instances a narrative serve as a proposition for a player to step into the virtual domain and fully internalise this developer input. Consequently, players then return the favour by running the proposed material past their senses, previous experiences and the preferences that have grown from those experiences, and paint the proposed material with unique meaning. This duality is argued to be the building block for levels of immersion and presence that create the virtual experience.

Lombard & Ditton (1997) also pay significant attention to how user characteristics can influence the degree of presence experienced. The agency of the user is underlined in how the willingness to suspend disbelief in the mediated environment can strengthen presence, but can also be weakened if the user purposely decides to remind themselves that the virtual environment is fictional. In addition, they point out that prior knowledge of the VR medium may also influence presence and immersion. For instance if the user is knowledgeable in the field of digital graphics and notices a flaw which consequently distorts their sense of immersion. Bala et. al (2016) considered virtual immersion with a virtual analytical tool that registered the focus points of players. The tool registered at what points in the story users would shift focus, and considered the role of audio against visuals. The study gives insight on which queues in the experience are wont to divert the user's attention. For example, users indicated they would begin exploring the environment upon the moment they had felt they familiarize themselves with the characters, suggesting that embodiment can be an important aspect of the early experience and indeed requires a syncing of player and avatar identities as a path to presence. A study by Sarker (2017) backs the aforementioned claims as findings reveal that users in VR experience boredom at the lack of audio-visual cues that guide the story. Secondly, such cues were indicated as frustrating when appearing too often as they lead to confusion amongst participants. The drive to explore an open environment hints at a need for player autonomy. Considering the ambiguity in defining presence, perhaps the most concise definition is offered by Bowman & McMahan (2007), who explain it as the subjective psychological response to a VR system.

2.4.3 Flow

Csikszentmihalyi (2014, p239) describes flow as the subjective experience in which just-manageable challenges are engaged and overcome, resulting in feelings of accomplishment and being rewarded. Forgetting time, fatigue, and feeling completely invested in the experience itself is what denotes the state of flow. This is relatable to the ideas of McCarthy & Wright (2004) who define virtual experience by four threads, one of

which is the spatio-temporal thread.They claim that experiences of space and time are constructed through interaction. Through interaction, time may feel slower or quicker or even fade if the interaction is engaging enough. The conditions for experiencing flow are, first of all, a clear set of goals so that the individual, or player in this instance deals with no confusions as to what the activity at hand demands. Secondly, there must be a balance between the challenges posed and the player's perceived abilities of overcoming these. This balance is a recurring presence in video games, with difficulty levels range from 'easy' to 'hard' offer the player a choice based on their own perception of skill. Third and last, flow manifests when immediate feedback occurs. In other words, the confirmation of the player's achievement must be immediately notable (Csikszentmihalyi, 2014, p232.) From this definition it is clear that flow is related to notions of motivation, challenge, and purpose, with the assumption that a virtual gaming scenario with frustrations related to these feelings affect or even prevent the sense of flow. Shin (2018) highlights flow as a more instrumental construct in the face of presence and immersion due to flow's action based nature. Indeed, flow points at a sense of accomplishment resulting from overcoming challenge, but not every game revolves or even involves challenge. For example, video games can be just exploratory, or purposely designed for their ease as the emphasis in game design relies on other qualities while also pursuing satisfaction of the user.

2.5 Understanding the subjective gaming experience

This study's focus on the VR player experience requires the consideration of studies that have identified key components in measuring player sentiment towards a game. Such models have often been the result of quantitative, data-based methods not in line with the qualitative motivations of this study. However, these have managed to assess what topics are relevant in evaluating the overall gaming experience and can therefore be adopted as theoretical references for preparing a qualitative approach tailored to the analysis of sensemaking. Phan, Keebler & Chaparro (2016) developed The G.U.E.S.S. model, created to pre-meditate or debrief player attitudes and preferences in gaming, based on nine distinct scales; usability/ playability, narratives, play engrossment, enjoyment, creative freedom, audio aesthetics, personal gratification, social connectivity, and visual aesthetics. The model was a result of the study's assessments of over 450 video game titles and thus appears as a reliable set of criteria in approaching player evaluation of virtual gaming on an implicit level, observable level. However, this study does not focus on social connectivity as the focus lies purely on the experience between the player and the virtual world. In addition, the topics identified in the G.U.E.S.S. model study fail to consider the importance of the context of the

gaming experience, as well as past experiences, but this could be accredited to due quantitative perspective taken be the authors.

Calvillo-Gámez & Cairns (2008) developed Puppetry as a theory by which the gaming experience is argued to be operationalised so that the otherwise subjective connotations of the concept can be interpreted more objectively, thus considering a more in-depth approach to gaming experiences. Three theoretical categories define Puppetry and are made measurable by additional subcategories; Control (virtual control and mechanical control), ownership, and facilitators. Virtual control is concerned with simple actions such as avatar control, the end objective of the game, and how the game keeps the player occupied while pursuing the end objective. Mechanical control is assessed by the accessibility of the controller hardware, while virtual control relates to the basic actions provided by the game, such as avatar movement, but also how the game keeps the player busy in pursuit of the game's main objective. Ownership refers to mastery in the game by means of completing goals set by the game or goals created by the player themselves. The player's own input results in rewards which further fuel player motivation towards goal achievement. Thirdly, facilitators encompass the player's subjective input towards the gaming experience (Calvillo-Gámez & Cairns, 2008). Previous experiences, time the player is willing to invest in playing, and the aesthetic value the player can identify in the virtual environment define the last category.

The approach of puppetry combines elements that define user experience such as the characteristics of the system's design and internal state (Hassenzahl & Tractinsky, 2006), but also the considers the phenomenological idea of an experience as a product of human subjectivity and flux of experience from which they make sense (Wieck, Sutcliffe & Obstfeld, 2005) but applies to them specifically to the gaming experience. The name of the theory implies that, much like theater puppetry, that it is the player who brings the game to life and in other words infuses subjective meaning into the game (puppet).

3. Methodology

This study was conducted by the author to gain an understanding of the sensemaking process taking place when players experience immersive gameplay in virtual reality. To verify the parameters of this (sensemaking) experience the study drew from existing user experience and gaming experience theory to formulate appropriate questions for semi-structured, in-depth interviews. However, prior these interviews, individual participants would partake in a virtual reality experience involving gameplay as part of providing participants with an interesting and uniform experience relevant to the questions of the interview. This study therefore did not adopt a mixed-method approach, but emphasises on qualitative, in-depth interviews with the inclusion of a virtual reality experience as a creative addition to the method. Consequently, the study refers to this augmented methodology as 'experiential interviews', where mentions of 'the experience' refer to the participation in the study's chosen virtual reality game.

3.1 Justifying qualitative methodology

But why a qualitative approach and experiential interviews? A fitting scientific research method which allows the researcher to theorize the meaning derived from user's experiences in a virtual reality experience is needed. In order to identify the patterns amongst the virtual user experiences in the present study, a qualitative methodology is best suited. Shin (2018) previously cited criticism of quantitative methods not being able to fully do justice in considering agency in the studying of user experiences applies here. In measuring VR and UX there are both quantitative and qualitative means by which experience can be measured. Witmer and Singer (1998) developed a questionnaire to measure the degree of presence experienced in virtual environments among participants, focusing constructs on systemics aspects of the VR experience such as the virtual environment, but also predispositions such as thinking of personal problems over the last 48 hours. As a result the questionnaire data managed to show connections between the participant's answers on presence in relation to factors such as performance, and the usability of VR gear. While insight in such positive and/or negative correlations offer an indication on the ties between categories which unravel more about the user experience, it is not statistics-based correlations which this study aims to evaluate. A scale-based survey cannot reveal the between-the-lines meaning participants can convey, while such meaning proposes a deeper understanding of the user experience.

Consequently, the methodology must match the fact that participants experience VR on the fully-immersive level, setting a demand for methodology that allows the researcher to theorize on a level of equal depth. Ritchie, Lewis, Nicholls, & Ormston (2013, p.49) recall individual interviews as one of few necessary qualitative methods in assessing phenomena such as experience, crediting the devoted attention to the individual, the detailed investigation of personal perspective, and depth of focus among main reasons. And indeed, understanding individual sensemaking sits at the heart of this study's research question, reflecting a need for depth as opposed to generalisations across a larger quantitative dataset. In addition, this emphasis on individual experience also justifies the choosing of experiential interviews over other qualitative methodology such as focus groups as it is the only appropriate methodology for studying the personal experience where focus groups are more befitting research in which understanding group dynamics, or interactions between individuals are paramount in answering the research question (Ritchie et. al, 2013, pp. 57-58). The chosen method of data collection if further complemented by grounded theory

3.2 Grounded theory

The studying of the emotions behind a human experience is rooted in the theoretical approach of grounded theory, where concrete reality is turned into conceptual data (Charmaz & Belgrave, 2012). Grounded theory follows an inductive approach where the research is based on findings without preconceived notions of the topic. Thus, there is no preliminary hypothesis. On the contrary, this approach to qualitative analysis is rooted in a explorative approach to the data. As such, it is a flexible method that grants the researcher the freedom to identify themes from the data, rather than devising themes on a preliminary basis and searching the data for segments that match these already existent ideas. (Baker, Wuest & Stern, 1992). Building grounded theory is very much a step by step procedure, comparable to an image of theoretical building blocks that gradually stacked up one another with a full-fledged theory as an the final construct (note: construct in the most literal sense of the word). As the theory builds and piles, the builder, or researcher in this case, frequently returns to the earliest building blocks to ensure their stability within the context of the entire theory that has been built. Grounded theory is considered particularly useful for research efforts related to topics personal experience, emotions, and identity (Charmaz & Belgrave, 2007), and the habit of continuously revisiting data while remaining close to the data is arguably an important reason for accrediting the approach such usefulness in areas of subjective research topics.

3.2.1 Grounded theory and coding

In the case of experiential interviews, the researcher transcribes audio files of each individual interview in full detail. The analysis assumes three stages. First, direct textual quotes stemming from the transcriptions form basis for the initial codes, or open codes. This can be based on a word-for-word or line-by-line basis in order to break down a chunk of interviewee text into segments. Secondly, axial codes come into existence as the researcher creates (tentative) categories which serve as umbrellas for combining open codes belonging to the same 'axis' in terms of thematic relevance (Grossoehme, 2014). As the analysis phase proceeds and new transcriptions are added to the dataset, combining axial codes are often also combined as a result of overlap. This process is repeated until no new themes emerge, and the existing axial codes can be considered definite. This is a repeated procedure as new transcriptions are added to the dataset, so that the author can reassess the data until no new categories are identified (Corbin & Strauss, 1990). Lastly, the selective codes come into existence as the established categories in the second coding phase are combined into core categories that each encapsulate respective areas of the data set.

It is from the theorising that has been ongoing since the earliest stages of the coding process up until the realisation of selective codes that the author can establish a new theory or model by which the topic of the study can be explained. Furthermore, the building metaphor in the previous section involves the frequent use of memo writing - a process where between during and between data collection and analysis, the author writes down relevant musings related to the development of the research (Charmaz, 2006. pp. 72-96). While taking notes may appear as a given in constructing theory through a lengthy process revisitation, memos are emphasized as the elements responsible for coherence and stability within the development of a theoretical construct. Observations, theoretical ideas, and meanings are examples of topics relevant in memos, their ultimate purpose being contribution towards the final draft of a grounded theory at the end of a study.

3.2.2 Grounded theory and cautions

But as grounded theory is recognised for its structured approach towards data analysis and consequent construction of theory, the researcher must also consider certain disadvantages along the way. Studying subjective experience requires not only the researcher's attention to participant sensemaking, but also the researcher's predisposition and how such a risk of bias during data collection or the data analysis phase. Grounded theories relies on the previously explained inductive strategy in building theory from the ground up based on data

(Charmaz & Belgrave, 2007). However, clashing perspectives among grounded theory scholars have considered the effect of a preliminary literature review, as well as topic knowledge already possessed by the researcher at the beginning of a study on inductive reasoning (Kelle, 2010; McGhee, Marland, & Atkinson, 2007). Researcher reflexivity is therefore argued as a means of being aware of how prior knowledge on a topic of research can weigh down on, for example, determining the line of questioning during an experiential interview, but also the creation of theoretical categories. Moreover, this study argues in favour of a prior literature review in relation to conducting grounded theory research as means of justifying clarifying key concepts in virtual reality and user experience. In addition, the author of this study recognises that the necessity of reviewing existing literature on the research topic strengthens the possibility of developing prior assumptions which in turn may harm the inductive development of theory. However, awareness of suchs risk will simultaneously heighten caution throughout the data collection and analysis stages of this study. It is with these cautions in mind that grounded theory is argued as an appropriate methodological approach in this study.

3.3 Sample

The study took place on a university campus in Holland, involving 10 participants of whom all but one were active students at the time. The need for participants to have experience with new media technology resulted in the age bracket of 19 to 35 as a demographic feature for the sample. This need was argued as a measure ensuring the experiential interviews as accessible to the participant in both technological aspect and topic matter. The close proximity of the researcher to a readily available student population resulted in convenience sampling, and ostensibly snowball sampling as the chosen strategy. Convenience sampling is often regarded in favour of research guided by time/ and or research constraints as the strategy demands no extraordinary efforts of locating criteria-based participants (Etikan, Musa, & Alkassim, 2016). Rightful concerns regarding convenience sampling are directed at the risk of sampling bias and a resulting risk of being unable to relate study findings to the wider population in relation to validity (Etikan et. al, 2016; Ritchie, Lewis, & Elam, 2013, pp. 81-82). Yet, wider generalisations are not as inherent to the purpose qualitative studies as it is to quantitative studies, nor matters of scale or distribution (Ritchie et. al, 2013), and this study does abstain from relating findings to the general population in favour of presenting theory upon which future studies, with greater validity in mind, may build. Further reflection upon this topic will be included in the reflections toward the end of this study.

Online sampling was done via Facebook student groups by posting sign up schedules offering dates and a time of choosing, while offline sampling was done by random approach, as well as asking participants to forward the message to peers potentially interested in partaking in the experiential interviews. Bearing in mind the theoretical implications of the environmental context of user experience and immersion, each experiential interview took place in a similar, secluded classroom setting. To further ensure that the influential conditions of the experiential interviews were the same for all participants they received similar explanations on the purpose of the study, the topic of the study, and the virtual reality experience that initiated their participation. Participants received instructions on the to-be-played VR roleplaying game named “The Well”, making using of the Samsung Gear VR HMD alongside single-handed controller possessing buttons and motion-sensitivity. Furthermore, five minutes of reading the game’s controller instructions on the HMD displayed were followed by 20 minutes of gameplay while physically standing at the center of the empty classroom. The researcher remained present for the duration of the experience in case of questions or troubleshooting. Upon completion of the experience phase, the experiential interviews followed immediately after in the same room.

3.4 The Well - a virtual reality RPG

The Well as a game was chosen due to the fact that it’s low level complexity made it accessible to all participants regardless of their predispositions on (virtual) gaming. It was a roleplaying game (RPG) with the participant assuming the role of the main character from a first person perspective. Within the classroom environment, participants received a briefing by the researcher on the general purpose of playing the game. Upon donning the HMD, participants were given around five minutes to acclimatise to the fit of the HMD and the handheld controller, as well as the opportunity to read the game’s tutorial on navigation and abilities inside the virtual environment. Upon entering the game, the participant was introduced to a fictional fantasy setting through a cutscene involving a fey deity providing a prologue in mysterious voice. The deity provided the participant with an archetypal background story of an enchanted world in decline at the hands of dark forces. As a result, it is stated that the once all-powerful benevolent deities of the realm are dying out one by hand. Furthermore, the participant is told that they were the only one able to turn the fate of the realm into a positive direction. In the wake of the cutscene, the participant would enter the game and find themselves in an eerie forest. From there, the experience began.

3.5 Operationalization

Data collection through experiential interviews required a list of topics close to the themes of the experiential interviews. Hassenzahl & Tractinsky (2006) defined user experience as a combination of internal state, traits of the designed system, and context. Phan, Keebler & Chaparro created the G.U.E.S.S model as a result of a lengthy evaluation process in establishing the most important aspects in a gaming experience. So too did Calvillo-Gamez & Cairns (2008) present the theory of Puppetry as a model for studying the gaming experience. The overlap of categories or constructs between these models proposed a direction for topics upon which participants could be asked to evaluate their VR gaming experience. The resulting questions can be found in Appendix A of this study. In addition, it must be noted that these questions served as gateways topics in the search for deeper meaning behind the user experience of the participant. In line with experiential interview data collection the initial questions are 'surface-level- questions used by the interviewer to raise certain themes and systematically dig deeper to uncover more of the interviewee's meaning (Legard, Keegan, & ward, 2003, pp. 139-144). Participant answers where underlying meaning was identified were therefore consistently met with follow-up inquiries prompting for further explanation.

For example, while discussing the manner in which one participant had experienced sound she made explicit how the sound effects made the gameplay more realistic. The researcher reflected upon this by rephrasing the participant's own words:
"Right, and I guess that- that realism adds to the experience?" This reflection then prompted the participant to further detail her meaning: "*Of course. In-in my opinion, that's the whole point of VR. It's-It's an effort to make the games feel more real. So you can experience like you are there. So everything from the sound, the graphics to the story needs to be compelling, needs to be intriguing, so you can feel that you are actually there."* As the researcher subtly drew the participant's need for realism in a fictional world into question, the participant raised narrative as being of being important part of her gaming experiences, explaining how this aspect created a desire to be inside the virtual world.
This exemplifies the essence of experiential interviews where explicit questions that were prepared have the potential of raising an entirely different topic within the context of experience. The result being the participant's self-reporting on a key concept of the study such as in this case presence.

3.6 Analysis

The textual segments dissected from the transcription of the conducted interviews were coded and analysed by to the standards of grounded theory (Charmaz & Begrave, 2007), with analysis being supplemented by review theory on experience and sensemaking, user experience, and the three conceptualisations of immersive experience (immersion, presence, and flow).

3.6.1 Open codes

The initial coding phase assigned segments of data to loosely defined codes based on an incident-to-incident approach (Charmaz, 2006), as demonstrated below:

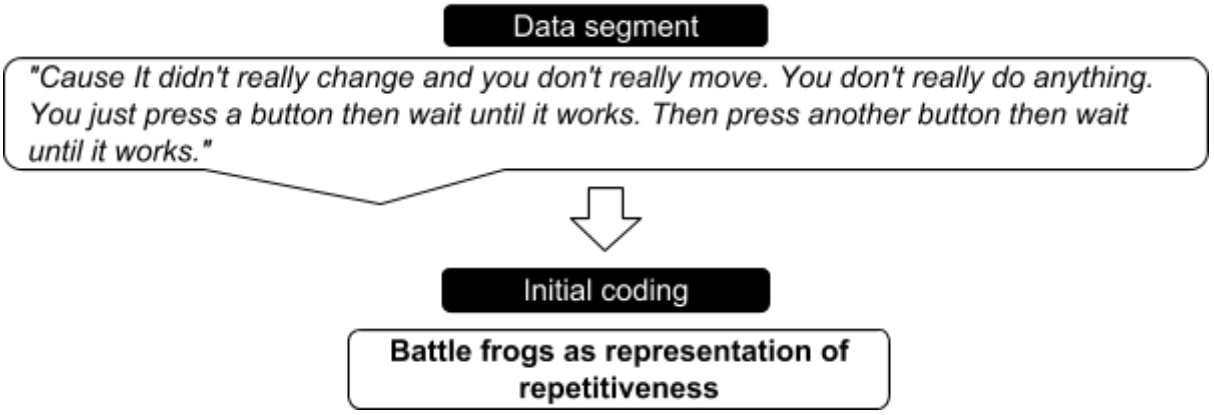

Figure 1.

The continuous coding process resulted in 16 early codes; the earliness of their definition evident by how their naming still closely resembles the theoretical models of game evaluation referred to for the devising the qualitative measurement part of this study. In order to refine them the researcher analyzed the dataset once more identify relationships amongst existing categories. In addition, certain categories would prove redundant in the sense that they referred to the same phenomena. Reassessing these 16 codes critically eventually resulted in six emergent axial codes that accurately reflected the meaning drawn from the dataset. Two open codes; *preconceptions* and *requirements for presence* were found to be too relatable to the meaning behind other codes, and were therefore collapsed before the axial coding phase.

3.6.2 Axial codes to selective codes

Figure 2. demonstrates how the analysis process progressed through each phase in the guise of a coding tree. Audiovisual stimulation reflected the implicit meanings reflected by participant on the basis of soundtrack and environmental sound cues alongside the visual aesthetics of the virtual environment. Physiological awareness was constructed in recognition of how feedback on hardware, spatial limitations and distraction, and the physiological context of the experience were made sense of, as well as time constraints. The interplay between the impact of sound, virtual aesthetics, and spatiotemporal triggers on the participant's sensemaking process combined the audiovisual stimulation and physiological awareness under the theme of *sensory meaning*.

Storytelling and internalising were two categories that both emerged from narrative-related data. Storytelling, speaking for itself, representing statements on the role of story in The Well, while internalising as a category represented statements in which participants referenced other forms of narrative to convey meaning within the context of the user experience. By merging these two categories, *saturating story* was created as an axial code denoting both these categories directly referred to story and storytelling in a similar manner. A second noteworthy occurence emerged in how participants projected self identity during discussions. These talks stemmed primarily from questions regarding character choice, or the concept of character context where the researcher probed for how and why avatars matter within the context of a game. The tentative category of customisation related to data in which the desire for customisation elements to enjoy a greater sense of personalisation within the gameplay context. The parallels of meaning between notions of virtual identity and the virtual avatar resulted in the creation of *embodied projection* as an important category. However, statements regarding story in the saturating story category commonly also pointed at a participant's need for story to be compatible with their personal identity. The category shared this core meaning with the ideas assigned to embodied projection. As a result, both categories merged under the theme of *narrative meaning*, reflecting participant sensemaking based on narrative elements of the virtual gaming experience.

The emergence of *designed direction* revolved around the user's experience of the systemic properties of the virtual interaction, particularly in relation to how the virtual environment design elements are decoded by the player and filtered into experiencing.The concepts of UI and (De)Motivators were merged as the latter denoted data codes in which participants spoke of what aspects of the VR experience, which were not related to narrative

or the physiological/spatial aspect of virtual reality, boosted their sense of engagement. Furthermore, the gameplay category originally denoted the way in which users were able to use the systemic boundaries of the virtual reality to exert their own sense of creativity, such as straying from objectives to pursue and seek out entirely new ones. The category of freedom represented user commentary on spatial exploration in the VE and what this entailed for their level of interest. Along the way, data segments related to notions of purpose and direction, and freedom proved interconnected and resulted in the emergence of the *perceived freedom* category. These latter two categories; designed direction and perceived freedom were not only evaluated for their representation of the balance between purpose and freedom in a game, but also the notion that meanings assigned to both related to the virtual gameplay design dimension. Consequently, they inspired the third and final theme of this study, simply named *virtual meaning*.

The three themes: sensory meaning, narrative meaning, and virtual meaning, resulting from the selective coding phase. The role of these conceptualisations of meaning will be detailed in the next chapter alongside the presentation of the conceptual model for interpreting the virtual reality gaming experience. This chapter has presented a step by step explanation for the methodological decisions in this study, critically reflecting on the choice for qualitative methodology, grounded theory analysis, sampling strategy, choice of gaming experience, and operationalisation.

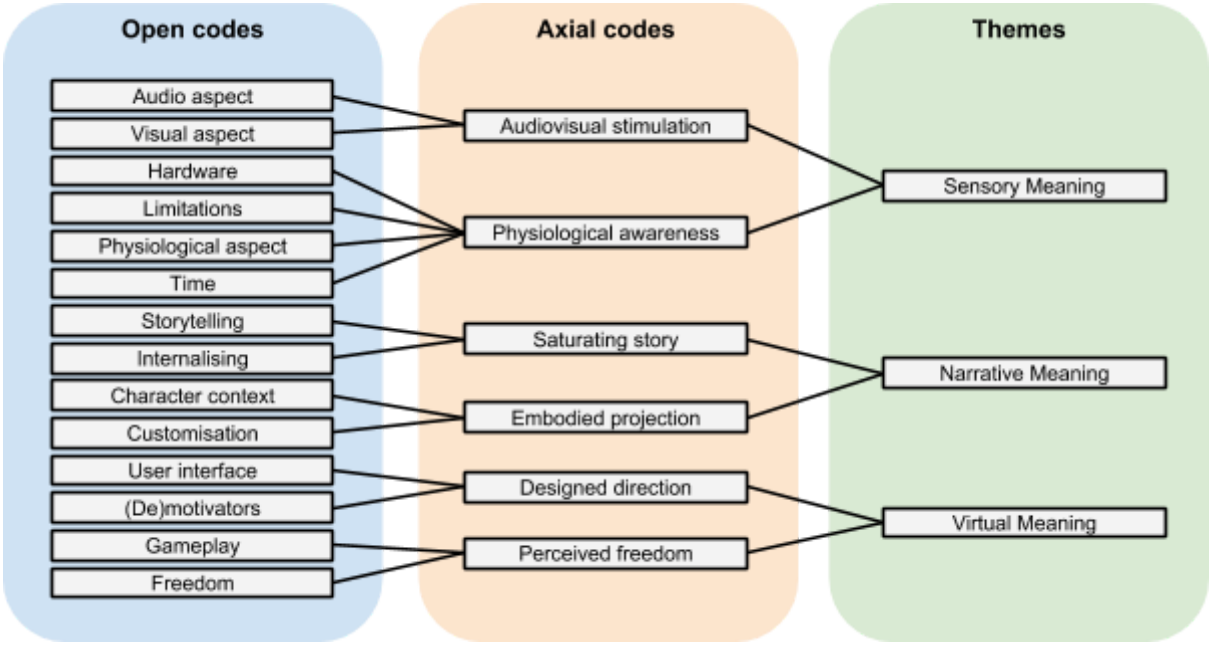

Figure 2.

4. Results

4.1 Sensemaking in a virtual reality game - three meanings and three stages

This next section details the sensemaking process as conceptualized in the model seen in figure 3. How do players makes sense of a virtual reality gaming experience? Sensory meaning, narrative meaning, and virtual meaning emerged as important themes in conceptualizing this experience. Within the scope of the virtual gaming experience these three themes play key roles in what is also proposed as a three-stage sensemaking process, including a pre-stage, a stage in which meaning is created, and a third stage in which immersion can be reached. The following section reflected on these stages,how they are connected to the themes of this study, and how these themes are relevant to immersion.

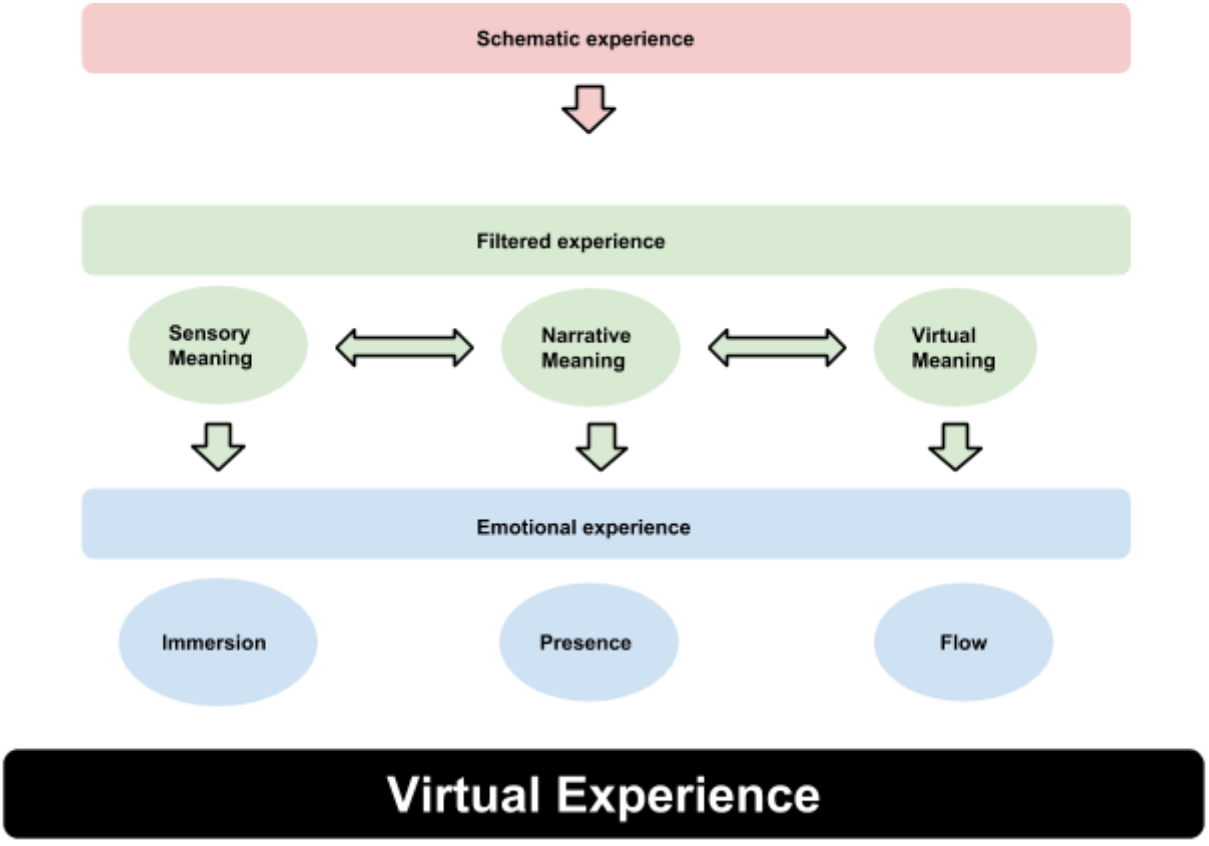

Figure 3.

4.2 The schematic experience: subjective characteristics as pre-experience

The schematic experience takes into account all of the user's influential preconceptions prior to engaging in the interactive virtual environment. Douglas & Hargadon (2001) definition of

what they refer to as schemas apply to the concept of experiencing on a level whereby the user's preconceptions serve as the active determinant. Schemas are described as mankind's readymade stores of occurrences and understandings similar to objects and occurrences we actively perceive. Through consulting schemas we are then able to make sense of these (new) occurrences, which brands schemas as our registers or data logs that human minds access to translate perceptions into meaning. Precedents, conventions and fixed genres must be taken into consideration in the design process of an interactive experience to determine what sort of interaction the user will expect Douglas & Hargadon (2001).

Therefore, this study argues that schemas already determine a fraction of the experience before the user has even interacted with the system offering the experience. Virtual or digital interactions present the user with stimuli that have no meaning unless the user can refer to notions by which these new stimuli can be compared. It is then also argued that visual stimuli are meaningless before the domains of the schematic and filtered experience have been consulted by the user to create meaning out of these meaningless stimuli. This assumption is in line with the puppetry theory's claim that the gaming experience is given life by the player with the gaming experience being constituted by the interaction between player and the virtual environment (Calvillo-Gamez & Cairns, 2008). This also draws into relevance the idea of sensemaking as a subjective process based on selection and retention (Chia, 2000; Wieck, Sutcliffe & Obstfeld, 2005).

4.2.1 Preconceptions

Indeed, with the user's preconceptions at play, there is a type of pre-experience within the user's psyche that is unrelated to the actual VR interaction itself. The moments leading up to entering the virtual environment have the user's mindstate shaping images of what can be expected, questioning how the actual interaction will match up to said image, how it can be compared to other past or recent mediated experiences, and so forth. In the case of the schematic experience, this highlights how the moments leading up to the virtual experience, however long (days) or brief (minutes) these moments may be, anticipation will take place. Thereby shaping a preliminary idea of what the experience will be like and how it will be felt in terms of emotions and meaning.

Preconceptions emerged early in the data analysis process and were predominantly related to the expectations the user may have had of the VR experience. Both the interviewing phase and the data analysis had made it evident that the aspect of user

expectations was largely present in each aspect of the experience upon which the participant was questioned. For example, the concept of saturating story reflected on the occurrence of users drawing upon familiar narratives to determine the manner in which the story of The Well was interpreted. While this was a dominant theme in the context of narrative, the relevance of such pre-conceived user opinions are also relevant within the context of other themes, and possibly even regarding characteristics of the experience that were not considered within the scope of this study. In addition, it emerged that previous gaming experiences determined to some extent how critically users assessed accessibility in the sense that the simplicity of the game mechanics was, for example, placed within perspective by how accessible the game was intended to be;

“Um, so for me it was, it was good, I guess, uh, I quite enjoyed it. Um, but I think there could have been more improvements, but I mean that just because it's, it's, it's meant for a certain demographic and I understand that.” - M.

The data set of this study allowed the researcher to draw certain lines between recurring topics that were identified and opinions that were expressed during questioning. However, the awareness stands that said opinions were likely carried more depth in terms of how the user’s background contributed to the shaping of these. While the interviewer inquired after previous experiences with virtual reality and gaming, additional factors played a role in shaping these expectations. A number of participants indicated that they would have preferred a different form of controller, either drawing comparisons to video game controllers they had used in the past or further elaborating on the motion-sensitive properties of the Samsung Gear VR 2 controller by expressing their desire for using controls fully reliant on these properties. Additionally, one participant mentioned her preference for personalized music playlists, where for example Grand Theft Auto allows the player to tune in to genre-specific radio stations where real-life artists can be streamed. This same participant also indicated sound as the most important aspect of her sense of immersion during the experience. Different opinions notably apply to different users. This is of course highly anticipated, but for the sake of this study’s theoretical approach to outlining the balance and relationship between different influential factors that make up the virtual experience, preconception is argued to be an influential characteristic of a virtual experience, thereby preceding the filtered experience.

4.3 The filtered experience - meaning as a result of needs being met

As visualized, the notion of having a pre-experience then influences the active domain, of which the initial form of experiencing is referred to the filtered experience. On this level of experiencing the user is actively aware of the interaction whilst physically interacting with the system, creating meaning by processing the virtual stimuli through the narrative meaning, sensory meaning, and virtual meaning as conceptual filters that serve as reference points in the player's sensemaking of the virtual gaming experience. With these filters, the user begins to make active sense of what they come across in the virtual environment while their schematic retention maintains an influential background role. McCarthy & Wright (2007) argue that the meanings ascribed to objects and experiences are emotionally laden and therefore become value judgments. It is therefore argued that the process of a filtered experience is akin to value judgment, with the conclusive outcome of this stage of experiencing being the ascribing of meaning to objects of the experience.

4.3.1 Sensory meaning as a conceptual filter

Sensory meaning is the type of meaning found representing the sensory, spatio-temporal, and physiological aspects of the gaming experience. How important is audio? Needless to say, opinions regarding such will differ among people in any given situation including this study. However, sensory meaning as a theme emerged as a result of how its sub-traits represent recurring topics in the data of this study. This section reflects on the researcher's identification of participants and their virtual sensemaking.

4.3.1.1 Sensemaking through sound

Sound proved itself as one of the most influential, if not the most influential trait of the VR gaming experience. Participants related the importance of sound to multiple topics, related to personal perception but most certainly recurring in the data. For example, often times sound became the reference gateway trait for participants to feeling a dominant sense of presence while taking part in the player experience. To demonstrate the sentiment of audio as a key to presence we look at an initial quote:

"And also with the sound, it makes you feel that you're really in the game. I think the sound really matters the most because it actually gets into when you play the game. At first you-you

feel a bit like "Okay I-I have this headphones", but uh.. When you use the gear and also you feel uh- You feel- see this sound effect, then you feel like.. you're really in the game." - T.

Additional comments echoed the same sentiment, stating that, for example, the sound itself is such an addition that without it a virtual reality experience would be akin to watching a film without the sound. The comparison to cinema draws on another form of media by which participants can make sense of their immersion. As virtual reality frequently blurs the lines between video gaming and cinema conventions, such references were interpreted as the participant inadvertently referring to the sensory level of presence by drawing parallels with other immersive forms of media. Imagine a movie theater hall where a feature film is displayed on the big screen. The hall is shaped in such a way that the sound echoes from the walls so attendants experience surround sound, their minds consequently become drawn into the visual environment portrayed on the screen. Moreover, participants made sense of sound as a criterion for how they experienced a sense of realism. In this context the audio was a part of expectation setting and related to the visual aspect of the player experience, as for example demonstrated below:

"So the audio definitely adds to the experience because like when you see something and like you hear, like the noise you're expecting to hear like- that you were like in the jungle kind of thing." - A.

Reality sets certain expectations that humans expect will be met in a virtual reality too, even in the case of a fictional setting such as The Well where landscapes may very well deviate. The participant enters a jungle setting at a certain part of the game whereby the way he constructs reality expects him to receive the audiovisual cues he has come to normalize from a young age. The sound of a rainforest, typically represented by a cacophony of different animals hidden away among the trees and the canopy, confirms his sensory expectations. It, therefore, allows him to forget that he is physically stood in a classroom on a university campus, in addition to allowing his mind to get lost in the feeling of being in a virtual jungle for the time being.

4.3.1.2 Sensemaking through aesthetics

In this instance, it becomes evident that the audio on its own is very much pivotal as a sensory component of the virtual user experience, but also intrinsically tied to the visual

aspect of the game. But why is it that these two characteristics of the user experience appear co-operative to such an extent? As virtual reality sets the expectation of visiting a reality that is alternate to their own, they expect their virtual representation of self to be able to make physical sense by being able to experience both the visual and audible. If not, the experience would simply be a blind, musical one, and further removed from reality. Naturally, the visual side to virtual is, at first glance, what constitutes virtual reality from an instrumental viewpoint. From the data related to this category the assumption is made that users experience the visual aspect on two levels; one being the visual aspect represented by graphics on a qualitative while the second facet to the visual character of virtual reality is represented by graphics in terms of scenery. This divide between how participants interpreted what they saw during the experience was predominantly related to their expectations of the game, which in turn could be traced back to the participant's overall expectations of realism. The distinction became clear based on how participants answered the question of how they had experienced the graphics during the gameplay. Some answers related directly to the graphics quality, or rather perceived lack thereof, in terms of display resolution, thus relating their visual perception to gameplay design;

"Of course. In-in my opinion, that's the whole point of VR. It's-It's an effort to make the games feel more real. So you can experience like you are there. So everything from the sound, the graphics to the story needs to be compelling, needs to be intriguing, so you can feel that you are actually there."
-S.

Meanwhile, while other users recognized that the game lacked, say, 4K screen resolution, they expressed themselves positively when asked about graphics. In such cases they translated the lack of realistic quality as supplementing the fictional theme of the game;

"There's a lot going on that keeps it. Um, it keeps you from not getting distracted I think and also from experiencing kind of a different world because it's not realistic, but it's like a fantasy world. Like in a movie, you know? So that very nice." - C.

An earlier memo had already established the assumption that gaming experience and/or frequency of gaming affected the participant's perception of what constituted a good graphical experience. For example, participant S., who is first quoted in this section additionally admitted that the lack of graphical quality took away from his experience of

realism as he was used to console gaming systems like the Playstation 4, where the graphics are represented by more sophisticated technology than the mobile HMD unit. Nevertheless, despite differing judgments on the quality of the virtual representation of the environment, the key aspect to this critical assessment of experiencing graphics is that, much like the audible side of this UX, users, first of all, relate to visual representation as an instrument of realism. The extent in which they can relate the virtual environment aesthetic to that of the real world possibly determines the degree to which the visuals are responsible for immersion. This will be further reflected on in 4.4.

4.3.1.3 Sensemaking in relation to hardware, space, and distraction

All participants reflected on the constraints of the mobile HMD. While there is no question that isolating property of the accessory claims responsibility for the fully-immersive nature of the virtual experience, it is at least the design of the Samsung Gear VR 2 that appears to take away from experiencing immersion at times. The weight of the accessory was reported as too heavy multiple times, yet curiously enough none of the participants experienced the HMD in such a way that it became actively obtrusive during the experience;

“Oh, I could feel it a bit so I guess it would be perfect if you couldn't feel it at all.” - P.

The quote by the participant above, albeit it brief, conveys the general sentiment identified behind the critical commentary delivered on the head mounted display during interviews. Participants do not strike off the accessory as an obstacle to the experience, but primarily convey that the fact it can be noticed in terms of weight and/or strain around the peripheral area serves as a distraction to the immersive characteristics otherwise delivered by the HMD through the virtual project. For example, another participant drew upon a pop culture reference to suggest her ideal vision for a virtual reality headset. The Netflix series “Black Mirror” features short stories in an era that is aesthetically similar to the real world in our present time, the only difference being the level of technology that has been reached in the show which far exceeds the possibilities in the present. The participant drew upon the scenario of a particular episode where plot characters apparently experienced virtual reality without the weight of heavy equipment from the past.
Seeking out the particular episode post-interview, the depiction of virtual in the show showed traits of technological augmentation (an injection in the brainstem) and only a minimalistic ear device to be worn on the person. Here the participant conveyed meaning about what the HMD had entailed for her user experience by referencing a futuristic portrayal of an identical

situation wherein the same characteristic of the user experience was a positive one. This implicitly labels the design of the HMD as a potential distraction, in this case, it due to its weight. This sentiment was further emphasized by participants who spoke of the manner in which they were aware of the HMD's size the moment they suffered an itch on the nose or face. At the same time, physical positioning emerged as a heavily influential factor to the overall experience. Where nine out of ten interacted with the virtual environment while standing for 20 minutes. Physical isolation and experiencing presence affected a number of participants in such a way that they indeed lost their sense of physicality during the experience and consequently shifted from their spot, bumping into classroom objects;

"I would say- Yeah, I would say, after a couple of minutes.. because you really lose a sense of time also. Think it's, you get so into then... I really forgot about this world, let's say it like that because sometimes I would keep moving and bumping into to table and then I would realize "Okay wait, i'm actually in a room" [laughs]." - P

This example of physical awareness reflects the importance of the context of the experience. Spatial interrupters broke user immersion upon the moment the user became aware of objects in the real world. The assumption is that this may be related to the user's subconscious unfamiliarity with the classroom interior, therefore being more prone to moving about carelessly. On the other hand, they may have felt virtually present to the extent that the physical realm was truly left behind and forgotten. There also were instances were other participants referred the researcher's presence during the experiential interviews, highlighting their awareness of his presence;

"I was also a little bit aware of the fact there were certain points where I was wondering, what are you doing right now? Are you just reading something on your laptop or were you watching me go around the room doing really weird stuff? So I was a bit aware of where I was, but I think there weren't that much super distracting things." - A.

While explicitly stated as not having felt overly distracted, the indication derived from the participant's comment is that she remained aware of being in the presence of an unfamiliar individual, consequently taking away from maintaining complete focus in the virtual reality. In addition, there was the awareness that the context of the environment was not only informal in terms of the environment in which the interaction took place but also the terms of the experience itself. Participants voluntarily signed up to partake in this study, but

nevertheless were placed in what is presumably a slightly uncomfortable situation where they are placed at the center of a spacious room while their vision of the real world is completely obscured, as is their hearing as a result of the headphones. In addition, the constraint of time, as 20 minutes were relatively short for an experience of this caliber, most certainly for first-timers, time itself is presumed to have exerted a certain influence on user immersion during their interactions. Furthermore, the fact that not all were fully certain of the role of the researcher's presence in the room with them, data referring to these occasions are also counted amongst limitations.

Do note that this paragraph does not intend to summarise limitations within the scope of this entire study, but does include them in the analysis to consider their influence on presence within the user experience. Considering sensory meaning undoubtedly powerful in how they contribute to potential immersion in the gaming experience. However, consideration of conveyed meaning regarding sensory characteristics of the virtual experience raises the assumption that if the user is actively affected by such characteristics, user perception of realism in the virtual environment is interrupted as a result of physiological distractions.

4.3.2 Narrative meaning as a conceptual filter

Narrative meaning represents meaning behind the representation of self-identity in the virtual environment and gaming experience. The manner in which the player can identify with the designated avatar in the game or other characters within the virtual world relates to the notion of virtual embodiment. However, narrative meaning also represents the meaning found in the storytelling of the game. This representation of meaning can be found in the game's storyline, but most certainly also in how players relate to storylines based on preferences and past story experiences. This section outlines the traits denoting narrative meaning, and how this concept was represented in data.

4.3.2.1 Sensemaking through story

Roleplaying games traditionally build heavily on the concepts of story and character building. The Well was centered around the archetypal narrative of a mythical world in decline where dark forces are on the rise whilst the forces of good steadily succumb to the enemy. The player is placed at the center, assuming the role of chosen one. However, while the game starts off with a prologue on the aforementioned, the overall participant response reflected

the element of story as fleeting throughout the interaction while also highlighting that they would have desired more of such storytelling throughout gametime;

“There was this storyline, and I could have had more of it because it was more immersive.”. .. “Yeah I wasn't in a street, I was rather in a weird realm of being. And the fact that there was a higher being telling me what to do. There was some power structure there and it was interesting. Like I woke up and I have memory of who I am but this creature is telling me who I am and what to do. So that was interesting in the beginning.” - R

The importance of story came forth as an interesting topic of discussion as, even in the virtual reality context, participants disregarded the need for realism as they relish the concept of storytelling for how it allows them to get lost in worlds and characters of the fictional nature. The prologue and further perceived lack of narrative throughout the game became a recurring theme in discussions and therefore required critical consideration. Certain participants indicated that they had not paid attention to the story when asked about it. It became evident that the low presence of storytelling consistency in The Well was responsible for story receiving lower amounts of user attention. Based on the revisitation of discussion regarding the lack of story, an assumption is made that the progress of story is a pivotal aspect for players to develop a sense of meaning. It is the telling of story that draws appeals to the emotion of the user and so holds the potential to draw the user’s mind into the virtual realm, fostering presence. Participants used their own examples of memorable gaming narratives to reflect what constitutes a meaningful story, and thus drawing on gaming narratives, film narratives or even book narratives becomes a recurring trend. One participant spoke of the roleplaying game Fable, while two participants on separate occasions referred to the renown Final Fantasy series;

“For example Final Fantasy. I-I have played like, I don't know how many games of this series, they are different every time. But I always know, always know, that the story is gonna be very emotional. Very- You will have surprises. Someone will die and you'll be like "Oh my god, no!" - C.

The way in which C. discusses the facets of story in Final Fantasy implicitly describes the need for an emotional evocation through narrative. By using Final Fantasy as an example she makes evident that it is a captivating narrative that includes unexpected turns and therefore triggers an emotional reaction, which will consequently result in emotional

investment in the experience. It is for this reason that storytelling should be considered a core element of the experience as it can be considered the one characteristic within the phenomenon that appeals directly to the sense of relatability of the user. One participant well worded this sentiment by stating that story is the thing that connects the overall experience due to the fact that each individual has a story, and story, therefore, becomes the one thing in human history that connects all. Indeed, considering each human individual has a story, so is there a story behind each user experience. Another participant conveyed his meaning behind the story by drawing parallels to a film script; if no characters or story are introduced properly, then the film automatically renders itself as not believable towards the audience. This resonates with another general sentiment within the data where participants indicated that they did not care for the narrative objectives behind the quests, simply due to the fact that the story of the game had not been consistently told.

4.3.2.2 Sensemaking through a virtual embodiment

The Well offered little to no narrative context on the identity of the first-person view player. Prior to entering the game, users were able to choose four distinct character classes, represented by a comic-style portrait; The Warrior, the Rogue, the Druid or the Mage. These classes are archetypes commonly found across different role-playing games, be it tabletop or digital game format. While a few players chose, for example, the Warrior as it was the first option in the selection screen, others made the decision behind what would represent their actual selves in the mediated environment a conscious one;

“Like that's this basically people always do so, like the same for when the game. Like if you see something that's familiar to if something you can identify with, that's the thing you choose and that also helps you engage. So I feel like that's one part of it. And the second part, um, I feel just because it's like you go through the VR thing, right, and you feel like you're in this world and then it helps. Like, if you have a character that does similar things that you do, so, like, it adds to the experience of, like, actually feeling like that you're in there.” - A.

Participants indicated, such as in the quote above, that the idea of character choosing then becomes a process by which the user is given the option to pick the persona that represents themselves in either appearance, characteristics, values, or relevant interests. The character essentially becomes an adapter, or projector between the user’s personal traits and the system fostering the experience on a systemic level. Like the concept

of sensemaking through story, this liaison-like function holds the potential to increase the user's emotional investment. A second facet to the idea of sensemaking through virtual embodiment rests on how customization comes into play. If the character or avatar itself affects emotional investment on a horizontal level, the ability to alter one's chosen character does so on a horizontal level. Participants referred to this concept not only directly how there should be a degree of creativity in changing the character's physical characteristics, but also the character's fate. Many participants used the video game series of The Sims as a symbolic reference for conveying their meaning behind optimal customization. Grand Theft Auto was also mentioned a number of times. Both indeed offer a wide array of character customization options;

"I mean, kinda like Sims where you customize your player. .. I think it would also be cool. I think okay apparently I had four choices so that's already giving you some choice of who.. yeah you wanna be in a game. But I think, I guess it would've been cool to also make yourself as a character. But then again you don't really see yourself, so then maybe just personality traits or your strength or weaknesses."
- P.

Within this notion of virtual embodiment, customization can be interpreted as the way by which users attach value to the virtual representation of the self through the opportunity of assigning unique traits to the way in which the virtual self appears, as well as the choices the virtual self makes. This proposition is in line with previously considered studies on virtual identity and the importance of a virtual representation of self (Slater & Usoh, 993; Murray & Sixsmith, 1999).

4.3.3 Virtual meaning as a conceptual filter

Virtual meaning represents the meaning identified in the designed aspect of the virtual experience. The gameplay, and how the balance between purpose and freedom relates to notions of motivation and a sense of achievement. This section reflects on the emergence of this theme in the data as the third conceptual filter.

4.3.3.1 Sensemaking by purpose

With regards to experiencing a sense of purpose, one phenomenon that emerged is related to the battle sequences in The Well. Battles were often times unavoidable as a result of

reaching certain locations for quest objectives automatically placed the user in a combat scene. With a turn-based battle system where the user and enemy choose a single attack turn-by-turn, participants reported separately on more than one occasion that doing battle managed to grow tedious within the 20 minute experience;

“Maybe something faster, maybe something that I could do myself, where I can actually influence the process because now it's like.. I get my coins, I get my new level, I find a new frog then I get a new weapon or something..” - P.

Evidently, it was not the frogs themselves that irked the user as they crossed the virtual land, more so the notion that the creatures became a symbol for the lack of dynamic changes in their interactions with the virtual reality. The user above reflects that sentiment by conveying that when the scenery and algorithmic cues of the gameplay become too predictable, not even rewards that would otherwise constitute a sense of achievement can make up for the lack of playability in the game. Simultaneously, participants often indicated a sense of purposelessness credited to the questing system. The frogs as a symbol for repetitiveness then raises the suggestion that the user has a need for dynamic elements that inspire a sense of purpose in the user. This sense of purpose also occurred in how participants discussed the aspect of user interface (UI). Questions related to this topic were simple and sparse, with the guiding question inquiring as to how the user had perceived the UI during their interaction. Opinions were divided between users encountering minor difficulties against users who benefited from the UI setup, but the need for a clear navigation through the virtual environment design can be tied to how the user’s desire to interact with the system is formed;

“And also the map because you saw there was a really big map and you only saw little parts, so. That's what's kept you interested. There was so much more to see.” - C.

4.3.3.2 Sensemaking through creativity

The map in the Well shows a vast environment to be explored. An overall finding that was noted in discussions with users was that the sense of spatial vastness was oftentimes responsible for user curiosity to explore more. At the same time, within the perimeters of the designated virtual environment, users derived creative meaning in instances where the system offered them a choice in what to pursue, and where to move;

“Um, for now what I just did, I think, um, you could, you could pour a lot of creativity into it because at the beginning you might, uh, you already had this kind of a riddle which you had to fix and if you want to you could really go and choose a mission and go fix that. .. .. And you could really focus on fixing one of them.” - C.

This degree of creative freedom, however, does appear to have boundaries. Probing further on the extent in which users wish to be given notions of creative freedom without losing their sense of structure, it became evident that there is indeed a line between experiencing enjoyable freedom in a game, and the way in which the gameplay forces certain objectives onto the user;

“You can't just give all of these tools and expect them to know what to do, because then you're getting through- they're going to be overwhelmed and be like, well, I'm done.’ I'm not, I, I can't. This is too much". - M.

4.4 The emotional experience - meaning as a gateway to immersion

How do All three conceptual filters discussed in this chapter serve the purpose of simplifying the idea of how users experience the abstract concept of emotion in the context of VR. The stage of an emotional experience refers to the user’s assigning of meaning in the wake of having selectively filtered the stream of constant experience in the virtual environment. The interaction is presented to all in a similar manner, and yet each user will assign different meanings to said components, and in turn derive different meaning in turn from the interaction with the virtual system. This also came up in discussions with participants of this study. One participant had little to no interest in video games, and while her answer regarding the VR experience with The Well was well-constructed, she openly admitted that games were not interesting to her. Her arguments regarding certain components of the overall experience lacked the passion that could be felt in voices and expressions of some of her fellow participants to whom games historically had emotionally-laden meaning.

The moment a user reaches the stage of the emotional experience, it is argued that a relationship is formed between the user’s emotional expectations and needs, and the traits of the virtual experience. The condition for this emotional experience is that the player identifies meaning in the traits characterizing sensory, narrative, and/or virtual meaning. It is further argued that the emotional experience is the stage in which the player’s sense of space and time are liable to fade, resulting in immersion. For example, participants in this

study commented on how their sense of time was slowed down while playing The Well as the context of the experience, the fact that they were participating in formal research, was forgotten. Participants experienced such warping in the spatial sense too as awareness of the physical classroom was forgotten in favor of the VE. Their physical surroundings at times only noticed due to disturbances such as physical contact with objects surrounding them. But how do these meanings relate to the degrees of immersion?

4.4.1 Sensory meaning as a determinant for immersion

Provided that the player yields sensory meaning from the virtual experience during the filtered experience, sensory meaning then becomes a condition for a player's immersion and flow. By the definition of immersion in this study (McMahan, 2003), the technological side of the virtual experience requires the addition of the player's expectations of the virtual environment being met by the actual virtual environment. Moreover, the virtual environment must be responsive and represent a degree of environmental realism. Sensory meaning represents these conditions in a similar matter on the basis that sensory meaning can be derived from the audio, aesthetics, hardware and the physical environment meet the needs of the player. Like this study's definition of immersion, realism also emerged as a notable topic during experiential interviews. The combination of sound as participants could recognize it from outdoors, alongside visuals that related sound to a relatable aesthetic represented this reported need. However, it was also noted that the physiological traits of the experience such as an ill-fitting HMD or slightly discomforting physical environment serve as a potential disruptor of developing sensory meaning on an emotional level.

This poses the argument that the extent to which the player's filtered experience elicits sensory meaning is, therefore, supplementing to the extent to which the player experiences the sensory properties of the virtual reality as realistic enough. This sets the condition that if a player relates sensory meaning on an emotional level, the player develops immersion. However, if the physiological traits of the virtual experience make the player too aware of the real world, the possibility for developing immersion is disrupted.

4.4.2 Narrative meaning as a determinant for presence and flow

The need for emotional investment emerged as the core sentiment behind the participant's reported importance of narrative. This, in turn, can be credited to participants subjective feelings determining how invested they will be in the game. The manner in which the narrative characteristics of the virtual experience meet this need through storytelling and an

identifiable character persona supplement that sense of investment in the continuous development process of the game's story. For example, the absence of a strong narrative element in the Well played a part in certain participants abandoning the game's storyline altogether and pursue exploration or meaningless battle sequences instead. Presence is perhaps the most subjective concept amongst all variations of immersion. Consider this characteristic of presence alongside the subjective nature of developing meaning from the narrative in a game. If player transcends the filtered experience on the basis of developing narrative meaning from a virtual game, it is assumed that experiencing story on the emotional level results in a sense of presence, as making sense of story is indeed purely based on the player's cognitive subjectivity (Bowman & McMahan, 2007).

"Yeah. Yeah, so then it's the fact that you are crawling into the skin of a person or might even be a creature or whatever that you're not familiar yet but you can explore." - R.

Storylines lay the foundation for how participants develop a sense of purpose, meanwhile drawing upon story formats they have already been familiar with. These familiar narratives thus serve as a handbook to interpreting new stories. Moreover, a connection can be identified between these two concepts. Both relate to the perspective of narrative as an experience. In addition, every human experience is perceived as a first-person state of being. Individual human beings perceive reality through their personal identity which is shaped by personal values reflects through one's behaviors and actions (Hitlin, 2003). Therefore, this study argues that in order to achieve a sense of being a part of, or rather feel as being in the story, users try to become aware of their virtual identity of self by placing said virtual self within the context of the virtual narrative. Consequently, when the facets of the storytelling itself are able to meet the emotional needs required for the user being able to invest their emotional self into the experience, narrative meaning is developed and the player reaches a state of presence.

4.4.3 Virtual meaning as a determinant for presence and flow

Thirdly, the ability of the guiding properties of the user interface to foster a sense of purpose and therefore motivate the user supplement motivation to engage with and explore the gameplay. This with the virtual environment offering the user enough freedom in exploration to assure the user that they enjoy creativity in the decisions they can make whilst moving around. At the same time, there is a need for challenge. Referring to the earlier

examples of participants complaining about repetitiveness in the game it is argued that virtual meaning is a result of the player's need for purpose, achievement, freedom, and motivation. This is comparable to the themes of ownership and virtual control in puppetry, which is measured by 'big actions', 'goal', 'something to 'do, rewards, and so forth (Calvillo-Gámez & Cairns, 2008). Virtual meaning represents the aspects of the virtual game that maintain the player's motivation to continue the gameplay. This can be challenge-based, but also having the game provide new experiences to maintain curiosity. In this sense, it is argued that virtual meaning derived from the reaching a goal set by the virtual environment will result in a sense of motivation as an emotional experience. That sense of emotional motivation spurs the player on to continue playing the game, resulting in flow (Csikszentmihalyi, 2014). However, as virtual meaning also stems from the extent to which the player can pave their own way in the game, the second argument links virtual meaning as the emotional motivation for the player to keep exploring the perimeters of freedom in the virtual environment. In such a case, the player experiences presence.

5. Conclusion and discussion

The purpose of this study was to conceptualize the gaming experience in virtual reality to understand the sensemaking involved. In the age of new media technologies, video game consumption is at an all-time high. Meanwhile, virtual reality is no longer a technology reserved for the select few with the means of being able to afford it. Today fast-paced developments in technologies have made virtual reality more accessible than ever. With VR becoming applicable in all sorts of practices, the opportunity of making sense of an experience in virtual reality gaming was seen as an opportunity of contributing to a field of study with growing relevance. In addition, a noted lack of qualitative studies on user experience in virtual reality gaming served as the main inspiration for proposing a framework by which an otherwise abstract phenomenon was given structure, and made measurable. In light of this idea, the research question was: How do players make sense of a virtual reality gaming experience, and how do the most meaningful traits of this experience relate to degrees of player immersion?

5.1 Main findings

Based on grounded theory analysis, the study identified three important themes in the data which further aided in making sensemaking measurable. Sensory meaning, narrative meaning, and virtual meaning emerged as concepts reflecting how players first and foremost rely on the physical side, the story elements in relation to one's own identity, and the design of the virtual environment in order to determine how meaningful the experience is to them.

The three concepts of meaning were designated as referencing frames for sensemaking within a virtual experience model detailed the steps of sensemaking during a virtual reality gaming experience. The importance of a player's subjective characteristics in the process of sensemaking was noted during the data analysis, leading to the proposition that a virtual reality gaming experience itself consisted of three separate yet interdependent stages of an experience serving as the parts to the sum that is a meaningful VR experience.

The first stage revolved around player's previous experiences and was argued as providing a form of 'pre-experience' in which retained memories of previous, meaningful experiences determine the expectations and needs in the virtual experience to come. This influence of pre-conceived notions reminded of what Douglas & Hargadon (2001) referred to as 'schema', to which this pre-experience was named the schematic experience. The second stage of the experience was argued as the stage in which meaning was created. The

interaction between the player's expectations set during the schematic experience, and the characteristics of the virtual gaming experience, the player was argued to develop sensory, narrative, and/or virtual meaning as a result of sensemaking, and thereby filtering the experience subjectively for meaningful components.

Sensory meaning was argued as developing from the player's making sense of sound, visual aesthetics, the hardware used to engage in gameplay, but also the extent to which hardware and the player's physical surroundings would serve as distractions to the potential immersiveness of the virtual experience. Secondly, narrative meaning was argued as resulting from the player's sensemaking with regards to storytelling elements in the game, and the extent to which character elements in the game would be meaningful to the player's own identity. Thirdly, it was argued that virtual meaning developed from the extent to which the designed part of the virtual experience, considering the extent in which the game provided enough purpose, challenges and yet also degrees of freedom in exploration outside of the game's objectives. This act of identifying meaning during the sensemaking process was named the filtered experience.

The third stage of the virtual gaming experience was named the emotional experience and argued that, on the condition of the player developing meaning as a result of their needs being met by the characteristics of the virtual experience, would invest more emotionally into the game on a deeper level. Therefore, It was proposed that the development of sensory, narrative and/or virtual meaning during the filtered experience served as a gateway to feeling immersion, presence or flow while gaming. Lastly, the claim then was that the physiological nature of sensory meaning would result in immersion, the ambiguous value of narrative meaning would result in presence, and the multifaceted traits of virtual meaning could foster both presence and flow. These three conceptual ideas of meaning characterize the sensemaking process in a virtual reality gaming experience alongside the three stages of an experience. How these conceptual ideas develop between the filtered experience and the emotional experience sets the precedent for an immersive experience. Finally, it is the characteristics of these conceptual meanings which determine what form of immersion will be experienced.

5.2 Limitations

Participants were required to be within the age range of 19 to 35, the justification for this being the need for participants who were expected to be digitally literate enough to participate in the experiential interviews without difficulty. However, the concept of an

experience is so multi-faceted that no single fundamental user characteristic can individually determine the outcome of the user experience. Consequently, the chosen age demographic is not considered to have a greater impact on the theoretical findings of this study.

In addition, the researcher is aware of the implications of the sampling process. nine out of 10 participants were active students on both bachelor and master study levels. A vast majority of these participants were known as attending studies in the field of media, communication and/or sociology as a result of convenience sampling. It is expected that these backgrounds may have had some implications for participant opinions on the topic of media reception. However, there were no indications that participants were aware of being interviewed to study their sensemaking. Furthermore, the presence of the researcher during experiential interviews is noted as a limitation. While this presence was consciously chosen for the sake of being able to assist the participant in necessary cases, this also resulted in the participant at times being aware of the researcher's physical presence. Consequently, the awareness of this potential influence has been taken into consideration in the answering of research questions as this relationship between physical distractors and presence was incorporated into the category of physiological awareness. In addition, physiological awareness also takes into account time constraints, which were an additional limitation to this study. In hindsight: a total of 20 minutes is a short time for the exploration of a game, especially when the user is new to VR systems. However, such time constraints did not deteriorate the participant's ability to report in great detail on their sense of experience during the interviews. These limitations naturally leave plentiful room to be built upon in research to come.

5.3 Future research

In the wake of this study's findings, it is proposed that future academic research in the fields of virtual reality and game studies alike further expand on an experience-based approach to further unravel the needs, obstacles, and potential of the user experience in a VR setting. The expectation remains that virtual reality will continue to be normalized in years to come as the digitization of modern society furthers. This normalization will likely entail a host of new meanings that humans will ascribe to using virtual reality as a media. Comparing the possibilities and power of social media platforms in the present is a world apart from the cultural relevance social media bore some ten to fifteen years ago. Social media now births cultural artifacts which influence daily lives in the physical world. In addition, modern businesses thrive on its usage, and targeted advertising in the social media sphere is as

normalized as billboards along the roadside. Will virtual reality reach a similar level of societal relevance? The current interest in virtual reality would suggest so and the coming years will tell. Whether or not this will be the case, the current societal inclination towards virtual reality is enough of a reason to assess what determines the use of this technology as meaningful. For the entrepreneurial designer or strategist, enhanced knowledge regarding the virtual user experience can benefit commercial ventures in the years to come. The concept of user experience has been widely researched for digital stationary and mobile systems, and yet approaching this concept from a VR perspective still holds many opportunities for academic exploration.

As such, it is proposed that future studies building on the approach and findings of the present study do so with greater resources. Mapping the virtual user experience with larger samples is expected to yield themes with even greater detail on the needs of the user. In addition, this can yield innovating knowledge on what distinguishes the user experience in 3D virtual dimensions from the user experiences on stationary and mobile computers. Another suggestion is for future studies with greater temporal resources to extend the length of an experiential interview. Participants in the present study mentioned the time constraints on multiple occasions, and it is therefore hypothesized that lengthier timeframes for virtual play experiences will yield enhanced in-depth results on the extent of user presence. Since this stage considered user presence as the final stage of an experience, future studies could also devote more detail on the facets of presence itself within the context of VR user experiences. Finally, seven out of 10 participants were women. While the implications of gender in user experiences have not been considered within the context of this study, future research could detail the potential difference in meaning-making in virtual experiences. With these referential notes the present study is concluded.

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Appendix A: Interview topic guide

- **Internal State**
    - In as much detail, describe your mood thus far on this day.
    - Please highlight any previous experiences with VR + video games
        - Probe for stance opinion on these
    - Can you describe your expectations of the VR experience?

- **Usability**
    - Can you comment on the accessibility of the game? = The ease with which you could navigate yourself through the game upon first try?
    - Please comment on of the use of the VR handheld controller?
    - Explain the role of the overall interface on your VR experience?

- **Visual & Audio aesthetics**
    - Please comment on the contribution of the audio (music + sound effects) to your experience
    - And what of effect of the graphics during your experience?

Play Engrossment

- Please comment on your the extent to which the game managed to keep your attention.
- What aspects were pivotal in keeping you engaged and why?
    - What points detracted you from being engaged?
- Please describe whether or not you felt like you were present in the virtual world (and to what extent)?
    - What do you attribute this to?

Personal gratification

- Please comment on your experience of what motivated you to continue exploring the game in as much detail as possible.
- How was this aspect tied to the extent you felt like you were *there*?

Creative Freedom

- Describe the extent in which you feel you could pour your own creativity in this gaming experience?
- How did this sense of creativity, or lack thereof, affect your immersion?
- Was there a sense of freedom during this experience?
- What did this entail for being immersed?

Narrative

- Please describe your experience of story in this game as detailed as possible.
- Please comment on whether or not the theme of the game appealed to you personally.
    - and did this enhance your engagement?
- How did the role of the character you played, hero, mage, rogue, druid, affect your sense of engagement in this experience?

Appendix B: Participant Overview

Participants	10
Gender	Female (7), (Male (3)
	3 males
Ages	19 - 27
Nationalities	Dutch (4), Lithuanian (1), Greek (2), American (1), Indonesian (1), Polish (1)
Education	University (8), HBO (2)
Level	Master's (5), Bachelor's (4), Unfinished (1)
Residence	Rotterdam (8), The Hague (2)