

Empirical Investigation of How Communication in VR Affects User Experience for Gen Z

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ABSTRACT

This study was conducted to shed light on the user experience in communication within virtual worlds. Specifically, the study examines how user experience is affected by communication in VR. The study has delved into Extended Reality (XR), Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) definitions and differentiations to provide a comprehensive understanding. Additionally, the historical context of games and applications that have facilitated communication in VR was explored. Furthermore, the research has reviewed previous studies and articles investigating the user experience in communication through traditional channels such as Messenger, Skype, E-mail, and WhatsApp. Qualitative methodologies were implemented in the study, using semi-structured interviews and analyzing the answers to find patterns within the answers of the participants that led to creating codes which were used to answer the research questions. Finding suggests that implementing virtual environment applications in communication has a significant positive relationship and effect on user experience for Gen Z. The model of Communication in VR Affects User Experience for Gen Z hopes to expand on the VR communication literature. Moreover, directions for future research activities are presented.

Keywords: virtual reality, user experience, communication, immersive

ÖZ

Bu çalışma, sanal dünyalardaki iletişimde kullanıcı deneyimine ışık tutmak amacıyla yapılmıştır. Çalışma özellikle kullanıcı deneyiminin VR'deki iletişimden nasıl etkilendiğini inceliyor. Çalışmada kapsamlı bir anlayış sağlamak amacıyla Genişletilmiş Gerçeklik (XR), Artırılmış Gerçeklik (AR), Sanal Gerçeklik (VR) ve Karma Gerçeklik (MR) tanımları ve farklılaşmaları incelenmiştir. Ayrıca VR'da iletişimi kolaylaştıran oyun ve uygulamaların tarihsel bağlamı da araştırıldı. Ayrıca araştırmada, Messenger, Skype, E-posta ve WhatsApp gibi geleneksel kanallar aracılığıyla iletişimde kullanıcı deneyimini araştıran önceki çalışmalar ve makaleler de incelendi. Araştırmada, yarı yapılandırılmış görüşmeler kullanılarak ve katılımcıların yanıtları içindeki kalıpları bulmak için yanıtları analiz ederek, araştırma sorularını yanıtlamak için kullanılan kodların oluşturulmasına yol açan nitel metodolojiler uygulandı. Bulgular, iletişimde sanal ortam uygulamalarının uygulanmasının Z kuşağı için kullanıcı deneyimi üzerinde anlamlı bir pozitif ilişki ve etkiye sahip olduğunu göstermektedir. Z Kuşağı için VR'daki İletişim Modeli Kullanıcı Deneyimini Etkiliyor, VR iletişim literatürünü genişletmeyi umuyor. Ayrıca gelecekteki araştırma faaliyetlerine yönelik talimatlar sunulmaktadır.

Anahtar kelimeler: sanal gerçeklik, kullanıcı deneyimi, iletişim, sürükleyici

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LIST OF ABBREVIATIONS

AI	Artificial Intelligence
AR	Augmented Reality
3D	Three Dimensions
HMD	Head Mounted Display
MR	Mixed Reality
PU	Perceived Usefulness
PEOU	Perceived Ease of Use
TAM	Technology Acceptance Model
UE	User Experience
XR	Extended Reality
VR	Virtual Reality

Chapter 1

INTRODUCTION

1.1 Background of the Study

Communication is a process where participants interact and exchange verbal and nonverbal messages, ideas, and emotions (Morency, 2010). Communication affects the relationships between individuals by acting on the needs and desires for parties within the process (Neustaedter et al., 2006).

The emerging concept of virtual environment's effect on communication was primarily suggested in the 1990s (Biocca, 1992). Virtual environments are immersive and the implementation of the avatars in virtual realities, users were able to access a real-time interaction that substituted in some areas the face-to-face communication (Abdullah et al., 2021). Virtual reality environments were upgraded to the extent that a broad scale of communication was introduced including verbal and non-verbal interactions represented as voice, gestures, proximity, facial expression, and haptic feedback (Baker et al., 2019).

Understanding and exploring VR communication can be valuable for college students as they prepare for their future careers in an increasingly digital and virtual world. Despite the presence of virtual reality since the 1990s, the technology became accessible to regular consumers after releasing the Oculus Rift and the HTC VIVE SteamVR headset in 2016 (BBC, 2016). For the purpose of the study, special attention

and focus will be placed on the history of the Oculus device from META, as this device (Oculus Quest 2) was used to support the analysis and justification of the study. The device was used to collect answers regarding the experience of Gen-Z using the device and compiling data, the compiled data will be stored in an Excel document, which will contribute to finding patterns that emerge in the user's experience during the experiment.

With the constant advancement of innovative technologies, the ways by which individuals connect and interact with one another are continuously expanding and transforming (Schwab, 2016). Individuals now have various communication options beyond the popular communication channels e.g. WhatsApp, Skype, Cord. Etc. in the rapidly evolving technological landscape. The modern era offers diverse communication tools, ranging from instant messaging and video calls to social media platforms. These technologies have revolutionized the speed and ease of communication and enabled individuals to connect with others across great distances in real time. Additionally, emerging technologies such as mixed reality, augmented reality, virtual reality, and artificial intelligence (AI) are paving the way for even more immersive and personalized forms of communication. As society embraces these advancements, it is clear that the future of communication holds limitless possibilities for how individuals engage with one another in personal, professional, and social lives (Soliman et al., 2024).

VR transports the user into a computer-generated environment instead of only adding virtual elements. This environment can be explored and interacted with, providing a deeply immersive experience (Yazici et al., 2024). However, the immersive nature of virtual reality presents unique challenges for users as it allows adjusting to an entirely

virtual world separate from the physical surroundings as physical safety of the user is at risk due to the nature of the technology.

Taking this further, it can be suggested that the interruption of physical safety can be challenging for some users to differentiate activities within the physical world from the virtual world an example of the interruption to differentiating the real world from the virtual world is the user's inability to notice the movement of members in the actual world while connected to the virtual world, which might potentially cause an accidental collision. While solutions have been incorporated into the devices themselves or through third parties, the mentioned problems should be addressed before discussing the technology's communication aspect.

When compared to augmented reality, which uses existing platforms of communication by superimposing them onto the real world (Yazici et al., 2024), communication in virtual reality is different. It is connected to a more familiar way of communicating, similar to communicating with people in the real world. Users use avatars in the virtual world to communicate with other users' avatars, this can be done through the use of specific virtual reality communication platforms (e.g., AltspaceVR, VRChat).

The relevance of virtual reality (VR) communication to college students is significant due to its potential widespread adoption in the future (Al-Ansi et.al, 2023). This is particularly evident when considering the responses of companies to projects such as Meta's Metaverse (Zallio & Clarkson, 2022). While there is a growing interest in these platforms, companies are also approaching them cautiously (Radianti et.al, 2020). For instance, Nike has recently opened a store in the Metaverse known as Nikeland

(Temperino, 2023). Moreover, BMW has opened the first factory in the metaverse as the first application of manufacturing in the Metaverse (Amaizu et.al, 2024). Although both emerging technologies related to communication and user experience have been subject of studies by various researchers (Vermeeren et.al, 2010), the technological innovations and noticeably increased interest in the Metaverse were pillar to highlight the importance of studying user experiences, as it is emerging to become a prerequisite for future communication methods in professional careers.

Moreover, VR communication is relevant to college students as it offers potential benefits in various aspects of their academic journey. It could enhance the learning process, aid in delivering engaging presentations, facilitate collaborative group projects, and even serve as a virtual platform for attending universities (Georgetown, 2022).

This study aims to test how social presence, ease of interaction, and interpersonal and group communication within the VR experience affect the perceived ease of use and perceived usefulness of the communication experience in VR while comprehensively understanding the various realities prevalent today to understand their effect on . This will involve detailed explanations of XR (extended reality), MR (mixed reality), AR (augmented reality), and VR (virtual reality), including their historical evolution and potential interconnections. Furthermore, User experience (UX) will be discussed to investigate the relationship between the user experiences in diverse popular communication platforms such as Facetime, WhatsApp, Messenger, Skype, and Zoom. Additionally, this study will examine the results using a technology acceptance model (TAM) and the media richness theory; hence, it will introduce readers to these models.

Additionally, the study investigates the methods employed by professionals and researchers to perceive ease of use and perceived usefulness of the communication experience to provide a solid argument on how Virtual Reality affects Gen-Z communication experience and investigate this technology medium effective in conveying information and communication. By analyzing these measures, the study aims to identify opportunities to enrich the field of study-related VR communication experience.

1.2 Statement of Research Problem

The use of virtual reality for communication has become more normal in recent years, especially in gaming and through the development of the Metaverse. Communication in virtual reality is still a novel idea for most people for a multitude of reasons. Several studies have investigated different usages of communication in virtual reality for specific settings and sectors like education especially in the COVID-19 era (Alnagrat et al., 2022); Al-Ansi et.al (2023) found that there is a positive relationship between the implementation of virtual reality in educations as the implementation of these technologies leads to a more interactive learning experience. This study, however, breaks new ground by being more focused and specific by concentrating on Gen Z and examining what is their perceived user benefit and user experience when Communicating within the virtual world.

1.3 Significance of the Study

Communication in VR is a new and growing way of communicating, and with the increased digitization of the world increasing interest for companies move to expand the metaverse, higher the importance will become, which will eventually increase the number of users using VR for communication (Bastug et al., 2017). Virtual Reality (VR) has also experienced a significant increase in adoption for communication

purposes due to the COVID-19 pandemic as it has indeed accelerated the interest in utilizing VR for remote communication (Zhang et al., 2021).

The world is increasingly embracing digitalization, and that has led to the rising interest in developing the metaverse, which is expected to draw in more users to utilize VR for communication purposes (Cipresso et al., 2018). Understanding user preferences in communicating through the use of virtual reality VR, especially among Gen Z, who are often referred to as 'digital natives,' as they show a strong inclination towards virtual means of communication (Mahapatra et al., 2022). They also prefer independent work, staying in virtual spaces, and communicating using abbreviations (Dobrowolski et al., 2022).

Incorporating user acceptance of VR technology and communication experiences is important for successfully integrating VR applications (Sagnier et al., 2020). Furthermore, VR technologies, by their immersive and interactive nature, align well with the principles of media richness theory, offering users a more sensory-rich and engaging experience compared to conventional methods (Alamäki et al., 2021).

Since it is crucial to consider that users communicating in VR would prefer the smoothest experience possible, this study hopes to broaden the information regarding the current user experience of the upcoming generation in relation to communication in VR and will examine users' acceptance of the technology, the communication experience in it, and the richness it provides the communication experience.

In conclusion, conducting research focusing on user experience, user acceptance, and preferences in VR communication is important for advancing the field of study

regarding the users experience in communicating through VR, especially with the evolving demands of this current and future digital era.

1.4 Aim of the Study

This study aims to justify how the implementation of Virtual Reality is associated with perceived ease of use, perceived usefulness and media richness by identifying the factors that attracted participants to their VR communication experience by analyzing the answers of the Gen Z participants and grouping similar experiences together to create a set of variables that can be classified and coded. The factors identified were based on the perception of the experience and the interpreted non-verbal cues, which contributed to identifying the participant's experiences within the VR communication experience and the factors that affected it.

The study will be based on experience-based semi-structured interviews by using the device to log into the VRChat and at the end of the session they were asked to answer the interview questions which will enable categorizing the questions and drawing the relationships and findings among the findings and the VR communication experience.

1.5 Research Question

This research generally seeks to understand how virtual reality experience affects various communication ways has arisen. Therefore, the following research questions were thought to be valuable to be investigated. The primary research question RQ1: How does Virtual Reality affect Gen-Z communication experience? To tackle the question stated above, a qualitative approach using Semi-structured interviews was adopted to assess the participants' responses to the virtual reality communication experience. The research questions below are set to answer the primary question of the research:

RQ2: What social advantage does communication in VR provide to Gen Z?

RQ3: How does ease of interaction in VR affect Gen Z experience?

RQ4: How does the VR experience affect the perception of communication experience for the Gen Z?

1.6 Limitations of the Study

Conducting research by nature is a long and extensive process that involves time and effort; In addition, various limitations might interrupt the process of the research. Moreover, when conducting a study, recognizing the limitations encountered throughout it is essential. It can be mentioned that the current study was interrupted by several limitations that are clarified as follows:

Time: The study was constrained within limited time, primarily due to the extensive nature of semi-structured interviews and the number of codes and data repetition generated by the number of participants. **Place:** This research was conducted in north Cyprus and on the EMU campus, however, this has presented itself as a form of limitation. This is because there was a specific age group for Gen Z between 12 and 27 that was limited even more to only students studying at the EMU in North Cyprus. This led to the study focusing on participants between the ages 18 and 25. **Platform:** While VRChat is an immensely popular platform, the research focused on how communication in VR affects user experience for Gen Z, and due to the limited hardware to access it was more challenging to conduct this study.

Chapter 2

LITERATURE REVIEW

The communication process is the process that allows individuals to interact with each other as without communication, individuals will lack the method of transmitting knowledge and experience (Sharma. R, 2017).

The human's connection to communication is as essential as the basic needs of life, whether verbal or non-verbal, communication was found to be a primary pillar to individuals on a personal or a social level (Sharma. R, 2017). It was later found that communication can be enhanced with the implementation of virtual environments to keep up with the fast-evolving pace. Based on the finding of this need, researchers have dedicated their time to study the relationship and correlations between user experience of VR and communication (Ch'ng et.al, 2020).

Virtual Reality (VR) is a technology that immerses users in artificial environments through various devices (Choi et al., 2014). Studies have dived into the multiple applications of VR, such as VR spectatorship (Oh et al., 2022), interactive storytelling for children (Yamada-Rice, 2021), and the use of VR in medical education (Barteit et al., 2021).

From a theoretical perspective, the knowledge acquired through this research was based on the literature of the history of communication, user experience, extended

realities, augmented realities, mixed realities, virtual realities, Metaverse, Technology acceptance model and VR Chats.

2.1 User Experience

User experience (UX) is a crucial aspect when it comes to the success or failure of any communication platform (Interaction Design Foundation, 2016). Moreover, user experience principles were found to hold elements related to psychology, computer science, and design (Delgado, 2022). It determines how users perceive and interact with the technology and ultimately affects their satisfaction and willingness to use it (Hornbæk & Hertzum, 2017).

The technology's ability to provide immersion and a sense of presence can significantly improve user experiences in the context of communication through VR. However, it is essential to understand the factors contributing to a positive user experience, such as ease of use, perceived usefulness, and social presence. The literature review will delve into numerous studies and research conducted on user experiences on communication platforms to provide a comprehensive understanding of the subject. Kaasinen et al. (2015) and Mahlke (2005) suggested that good user experience is considered as the main pillar for customers in regards to either goods or services which indicates that the concept of User Experience (UX) stemmed from both the instrumental and non-instrumental parts of using a product. Different lines of research concerning non-instrumental were categorized into three segments: Hedonics, Aesthetics, and pleasure/fun (Lee & Andereck, 2016).

Becker et al. (2019) referred to hedonics as the emotional aspect of user experience, focusing on the pleasure or pain that users feel while interacting with a product, while

he suggested that aesthetics, on the other hand, examines the sensory appeal of a product, including its visual design and overall attractiveness, lastly, pleasure/fun encompasses the enjoyment and entertainment users derive from using a specific product or service.

By studying these various aspects of non-instrumental user experience, researchers can gain insights into what factors contribute to a positive user experience and how it can be improved. Hedonic attributes are greatly different than pragmatic attributes, whereas pragmatic attributes are focused on how individual fulfil their behavioral goals, hedonic attributes focus on the psychological well-being of individuals (Hassenzahl, 2018). Accordingly, both attributes can be considered within the user experience of virtual reality communication since it connects to both the psychological and behavioral aspects of individuals.

User experience usually also investigates another aspect, which is the pragmatic aspect. The pragmatic aspect of user experience focuses on the practicality and functionality of a product. It considers how well a product meets the needs and goals of the users, as well as how efficiently it allows them to complete tasks (Marques et al., 2021). This aspect examines factors such as ease of use, intuitiveness, and the effectiveness of the product in helping users achieve their desired outcomes. By considering both the aesthetic and pragmatic aspects of user experience, designers and researchers can create products that are not only visually appealing but also highly functional and satisfying to us (Hassenzahl, 2018).

Sela (2022) suggested that pragmatic products are instrumental as it is designed to generate behavioral goals whether internally or externally. An example of this was

mentioned by Hassenzahl (2018) when comparing it to drilling a nail into the wall and the tools needed to do so; he suggested that from a pragmatic perspective, the tool required to pin the nail is the only requirement. However, knowledge of how to use it will be essential.

2.1.1 User Experiences in Other Communication Platforms

The study will look into research and historical information regarding five popular social media communication platforms which are Facetime, WhatsApp, Facebook Messenger, Skype, and Zoom.

2.1.1.1 Facetime History & User Experiences

Facetime history began in 2010 when Apple introduced the video calling feature for its devices (Senft, 2023). Since then, it has become a popular way for people to connect with their friends and family across the globe. Facetime has revolutionized the way people communicate, allowing them to see and hear each other in real-time, no matter the distance (Collegesidekick, 2024).

Users have praised the high-quality video and audio and the ability to make conversations feel more personal and intimate. Whether it is catching up with loved ones or having virtual meetings, Facetime has become an essential tool for staying connected in today's digital world (Lindner, 2024). Facetime's user-friendly interface and seamless integration with other Apple devices, like iPhones and iPads, have made it accessible to a wide range of users, regardless of their technical expertise. Additionally, the app's end-to-end encryption ensures that conversations remain private and secure.

With the ongoing advancements in technology, it became a point of interest to see how Facetime continues to evolve and enhance the way communication will evolve in the

future. User experiences with Facetime have been positive, with many praising its smooth connection and high-quality video and audio (Singhal, 2023) as it contributed to allowing people to feel closer to their loved ones.

This conclusion was mainly discovered during the COVID-19 outbreak as, during the pandemic, governments across the world have issued an emergency waiver of the Health Insurance Portability and Accountability Act (HIPAA) as permission to several popular applications of audio and video chats, but it wasn't compliant with HIPAA regulations. (Wright & Caudill, 2020). This temporary suspension of HIPAA compliance allowed individuals to continue using these popular video chat applications to stay connected with their loved ones during a time of social distancing and isolation (Padala et al., 2020).

The importance of maintaining strong connections and communication with family and friends became even more evident as people sought ways to stay connected and supported each other through the challenges brought on by the pandemic. Although the waiver was put in place as an emergency measure, it highlighted the significance of technology in fostering connections and bridging the physical distance between people.

2.1.1.2 WhatsApp History & User Experiences

WhatsApp is a messaging service that is owned by Meta, previously known as Facebook, and it is available for free. The application was founded in 2009 by Brian Acton and Jan Koum, its main concern is for users to transmit text and voice messages on the platform, as well as engage in real-time communication through audio or video chat, it can also further facilitates the sharing of location and images (Martin, 2023). The service is predominantly utilized on mobile devices, as it necessitates a

mobile phone number for registration, however, it is also accessible through a computer's web browser, the application supports local and international (Martin, 2023).

Furthermore, in 2014 Meta, previously known as Facebook, acquired WhatsApp for nineteen billion dollars. The platform has only been gaining popularity with users ever since in the year 2021, WhatsApp had more than 2.2 billion users worldwide (Deutsch, 2024).

Moreover, during a study conducted regarding the need of fulfillment and experiences on social media by (Karapanos et al., 2016), several insights regarding the needs that get addressed by users upon their usage of WhatsApp came to the conclusion that the main factor is its ability to afford intimate synchronous communications, crafting desired experiences on the recipients, allowing people separated by distances to be present in a significant life event, that is made possible by the platform providing the users the ability to transfer photos, videos, documents, etc., in addition to the audio and video communication aspects (Karapanos et al., 2016).

2.1.1.3 Facebook Messenger History & User Experiences

Facebook introduced its proprietary chat platform, Facebook Messenger, in 2008. This functionality enabled users to engage in real-time communication through instant messaging and exchange private messages with one another (Pedroso, 2023). Originally, this functionality was restricted to website users. However, in 2011, Facebook introduced its independent mobile application, which allowed Users to send messages, photographs, and videos directly from their mobile phones (Viplesh, 2023). Subsequently, Facebook Messenger has emerged as one of the most prominent messaging platforms globally. Nowadays, the number of active users exceeds 1.3

billion. On the other hand, Facebook Messenger offers a wide range of additional features that make it more than just a communication tool. Users can play games, send money to friends, and even order food through the platform. With its integration with Facebook, Messenger also allows users to connect with their existing friends and contacts easily. The platform also offers a variety of fun and interactive filters and stickers that users can use to personalize their conversations. Overall, Messenger provides a more immersive and diverse user experience compared to WhatsApp (Brailovskaia et al., 2018).

2.1.1.4 Skype History & User Experiences

Skype is a software used to facilitate communication over the Internet; it supports voice, video, and instant message capabilities, taking into consideration that it was one of the first successful implementations of conducting calls on the Internet (Britannica, 2023).

Skype was founded by Niklas Zennström and Janus Friis. They first introduced the software to the public in 2003, and by 2005, it had gained a user base of about fifty million. That number would later increase tenfold over the next five years to reach around six hundred million users.

Skype was sold to eBay by Zennström and Friis in 2005 for a primary \$2.5 billion in addition to an eventual \$500 million that were agreed to be paid as incentives (Britannica, 2023). Afterward eBay bought the service, they found out that it did not fit well with their business model, thus they looked to sell it again.

The American company Microsoft Corporation managed to buy Skype in 2011 for \$8.5 billion and planned to add Skype to its Xbox video game console, its Microsoft

Outlook e-mail software, and Windows smartphones; that is why it was bought by Microsoft so that they can incorporate it to their other services (Britannica, 2023).

Skype has been an important tool in communication, as it was able to enhance user experiences due to its feature of in-network long-distance calling, which allows users to make audio and video calls to other users free of charge. This feature has been facilitated by Skype's usage of Voice over Internet Protocol (VoIP) technology, which enables users to have instant real-time voice and video communication over the Internet (Watanabe, 2023; Lo Iacono et al., 2016).

Skype's ability to connect numerous places visually and audibly by providing online video and audio connections has been important in various contexts like its use in clinical practice, where it has been proven to be both feasible and beneficial (Statton et al., 2016). Additionally, Skype has been largely used for the purpose of foreign language learning, with multiple small companies and individuals offering language practice sessions through the platform (V et al., 2016).

The platform's significance in communication also extends to research applications. As studies provide a case for Skype's usability for qualitative research interviews due to its ability to record audio and video simultaneously without requiring the use of any additional equipment (Lo Iacono et al., 2016).

Furthermore, the impact of Skype on social connections is clear, as it has been used to connect distances and reduce the feeling of loneliness of its users, especially among older adults of the users, indicating its effectiveness in treating depression over the long term (Share et al., 2017). The platform's role in enabling communication over the

internet, irrelevant to time and space, has been highlighted, emphasizing the need for users to adapt to new communication norms.

In conclusion, Skype's offering free in-network long-distance calling for audio and video communication over the Internet has significantly improved user experiences. Its versatile and user-friendly features help build connections, enable research, support language learning, and enhance clinical practices.

2.1.1.5 Zoom History & User Experiences

Zoom is a software developed and sold by a US-based Company that have the same name Zoom, the software is used for video communication over the internet, and it is considered one of the most popular services around the world of its kind (Zoom Video Communications, 2024).

The most significant factor of success for Zoom could be attributed to the COVID-19 outbreak. Early in 2020 the global coronavirus pandemic resulted in many businesses' employees working from home, Zoom gained the most from this transition, use of the application at work introduced it to new customers, who began to use it socially as well (Volle, 2023)

By December 2019, zoom service was used around ten million times a day and increased to 350 million daily users by December of 2020, while the revenue of the company also indicated that it grew from \$331 million in 2019 to more than \$4 billion in 2022 (Volle, 2023).

Some of the features that gravitated users to this platform were screen sharing, recording, and automatic transcription, and it is also good to point out that the program

is available to mobile and desktop devices, noting that Zoom is distributed with a freemium license, which mainly suggested that the service is offered without a paid subscription (Volle, 2023).

Zoom's ease of use, cost-effectiveness, and security features have made it a preferred choice for qualitative data collection, especially during the COVID-19 pandemic (Richardson et al., 2021). Users have reported positive experiences with Zoom, recommending it as an alternative to face-to-face interactions and other video conferencing platforms (Labinjo, 2021). The platform supports real-time audio and full-motion video, enhancing user experience during meetings (Lobe et al., 2020).

Even with emerging issues regarding personal data collection and security concerns, Zoom has become the preferred tool for video conferencing, as it surpassed other online communication platforms like Skype during the COVID-19 pandemic (MacMullin et al., 2020). Studies have indicated that Zoom's features and tools, such as its breakout rooms and screen sharing, have been beneficial for the enhancement of the collaborative skills and self-efficacy of its users in various educational settings (Hartono et al., 2023).

Furthermore, Zoom's features, like screen sharing and recording, have been instrumental in the conduction of focus group studies and online assessments (Oyekoya et al., 2021). The platform's user-friendly interface and supportive features have made it a suitable choice for virtual peer learning and online clinical assessments (Utharaj et al., 2022). Teachers have utilized Zoom's features like breakout rooms and whiteboards to engage students effectively during online learning sessions (Gozali et al., 2022). lastly, Zoom's features, like virtual background and screen display options,

have made it a preferred choice for classes online (Yasin et al., 2021).

To conclude, Zoom's numerous features, its ease of use, and the positive user experiences it provides for its userbase have positioned it as a leading platform for video conferencing, qualitative data collection, online education, and virtual assessments, especially during the COVID-19 pandemic.

2.2 Extended Reality (XR)

Extended Reality (XR) a term that connects different concepts mostly related to Augmented Reality (AR) and Virtual Reality (VR) (Rauschnabel et al., 2022). Rauschnabel et al. (2022) initiated to find a consensus for the definition of XR due to the multiple definitions related to it. Within the in-depth interviews conducted in the study with industry experts' various definitions were developed. In that regard, the researchers suggested that the letter X in XR does not represent a specific reality or technology but is only a placeholder for whatever reality that falls under it, either AR, VR, or even MR (Lee et al., 2021, as cited in Milgram & Kishino's Reality-Virtuality Continuum [7]).

Extended Reality (XR) is an important technology to understand first before delving into other immersive technologies as it gives a holistic perspective to the broader landscape of immersive technology because the term Extended Reality (XR) serves as an umbrella term (Andrews et al., 2019). XR basically combines digital and physical environments to create immersive experiences for the user that bridge the gap between the real and the virtual worlds (Andrews et al., 2019). This combination of realities has led to the introduction of innovative applications in multiple fields, like in the healthcare and education fields, which shows the transformative potential of XR

technologies (Andrews et al., 2019).

In the medical field, Extended Reality (XR) technologies, specifically Medical Extended Reality (MXR), have significantly enhanced visualization and modality in healthcare applications (Çöltekin et al., 2020). MXR involves displaying virtual objects in real environments (AR) or creating fully virtual worlds (VR), often using head-mounted displays for medical purposes (Ong et al., 2021). These technologies have demonstrated effectiveness in improving medical training, preoperative planning, and intraoperative utilization, resulting in enhanced accuracy and efficiency in healthcare practices (Mourtzis et al., 2022).

Furthermore, XR technologies have been applied in high-performance domains like sports to enhance perceptual-cognitive and motor skills (Noury et al., 2022). Professionals in sports psychology and medicine leverage XR to optimize training regimens and skill development, ultimately improving performance outcomes (Noury et al., 2022). As for digital manufacturing, XR bridges physical and virtual worlds, which in turn enhances operational efficiency and enables new possibilities in Industry 4.0 (Šlosar et al., 2022).

Furthermore, in educational settings, XR plays an important role by creating immersive learning environments that seamlessly combine physical and virtual elements (Turchet et al., 2021). By incorporating XR technologies, educational institutions such as schools and universities can enhance the learning experiences, which in turn helps improve knowledge retention, and foster interactive pedagogical approaches (Turchet et al., 2021). XR's significance in public health education has also been highlighted, as it shows its potential to enhance the training tools and educational

experiences for the users (Beams et al., 2022).

Integrating XR technologies, including VR, AR, and MR, collectively known as Extended Reality (XR), is increasingly recognized as a promising approach in various fields like healthcare, education, and industry (Kolditz et al., 2023). The versatility of XR enables innovative applications and transformative experiences that lead to the shaping of interactions and practices across different domains (Kolditz et al., 2023). As XR continues to advance, its impact on communication, research methodologies, training practices, and educational approaches is expected to expand, emphasizing its significance in the evolving technological landscape.

2.3 Augmented Reality (AR)

Augmented Reality (AR) technology falls under the umbrella of Extended Reality (XR); Augmented Reality (AR) technology has evolved and improved significantly over the years. As it was Initially conceptualized in the 1950s, the term "Augmented Reality" was officially coined in the year 1990 by Tom Caudell and David Mizell (Carmigniani et al., 2010).

The basic definition of Augmented Reality (AR) involves introducing a new layer to the real world through the use of a device (Grubert et al., 2016). As Augmented Reality (AR) is basically projecting and overlaying digital information on top of the real world in real-time, thus creating a combined view for users (Wang et al., 2017). Augmented Reality (AR) has been defined in several ways, but it typically refers to a combination of digital information with the real world, presented in real-time (Rauschnabel et al., et al, 2022).

There are multiple avenues for Augmented Reality (AR), varying in price and

complexity. For example, there are Augmented Reality (AR) technology examples like apps that create a 3D render on your mobile device when you scan a QR code (Sungkur et al., 2016). This method is one of the simplest and most cost-effective ways for consumers to experience Augmented Reality (AR) technology.

This demonstrates how technological advances and the ubiquity of mobile devices have made Augmented Reality (AR) accessible to a considerable number of users (Kiourexidou, 2024).

A marketing campaign has been conducted by the Tommy Hilfiger fashion brand. They introduced screens in selected stores that superimpose their clothing over what you are wearing, According to Medium (2023). By using Augmented Reality (AR) technology, Tommy Hilfiger has improved the in-store shopping experience for their customers by allowing them to virtually try on clothing items, providing a one-of-a-kind experience and an interactive way for the customers to engage with their products (Bonetti et al., 2017). This strategic implementation of Augmented Reality (AR) technology aligns well with the trend of using technology to simulate in-store experiences and close the gap between the physical and digital retail environments (Azuma, 2019).

The usage of Augmented Reality (AR) technology in the fashion industry has been a transformative force, as it is enabled brands to offer a personalized and immersive experiences to consumers and customers (Gao, 2023). Through the use of Augmented Reality (AR) applications, fashion companies can present products to the customers by embedding and superimpose virtual content into the customer's real and physical environments, thus creating an interactive and real-time engaging and interactive

opportunity (Bonetti et al., 2017). This strategy does not only improve the experiences of customers and consumers, but it also plays a role in the experiential marketing tactics that helps encourage consumer interaction and also helps fostering brand loyalty (Erdmann et al., 2021).

Furthermore, the effect of Augmented Reality (AR) on the motivation and engagement of users in educational settings has been explored, which demonstrated that the Augmented Reality (AR) systems can significantly improve the students' motivation in multiple courses, an example of the courses is in visual art (Di Serio et al., 2013). The interactive nature of Augmented Reality (AR) helps and allows for the superimposing of virtual information onto the real world; this, in turn, helps in improving and expanding the learning experience (Klopfer & Squire, 2007). This combination of real-world with the layer of virtual information is a very important feature of Augmented Reality (AR) as it contributes to the effectiveness of education and training for the users.

As for industry and commerce, Augmented Reality (AR) has been identified as a transformative technology that has the potential to revolutionize and update multiple fields and sectors. Studies have shown that the usage of Augmented Reality (AR) in education highlights its role in improving the learning experiences and providing interactive educational content for users (Yuen et al., 2011). Furthermore, the integration and usage of Augmented Reality (AR) in tourism has provided multiple new options and possibilities for improving the tourism experience of the users through introducing interactive and immersive content (Kounavis et al., 2012). By introducing and superimposing digital data into the real world, Augmented Reality (AR) has the ability to change and revolutionize how information is presented and accessed by users

in various industries.

The evolution of Augmented Reality (AR) technology has also had an important effect on healthcare and medical education. Research has shown the usefulness of the interactive nature of Augmented Reality (AR) in healthcare education, highlighting the technology's ability to improve learning experiences for users through the combination of the real-world environments with the virtual imagery (Zhu et al., 2014). Furthermore, the application of Augmented Reality (AR) in surgical procedures has shown the technology's potential for enhancing and improving surgical outcomes and enhancing the visualization of complex anatomical structures (Bernhardt et al., 2017). By providing real-time guidance and visual information, Augmented Reality (AR) technology has the potential to change and revolutionize how medical procedures are conducted by professionals and taught to students as well .

As for the field of education, Augmented Reality (AR) has emerged as a powerful tool for helping and improving student engagement and learning results. Studies have indicated a positive effect on student engagement and learning experiences by integrating Augmented Reality (AR) elements into environmental education field trips (Kamarainen et al., 2013). Furthermore, research has indicated that there is an impact of Augmented Reality (AR) applications on student motivation and learning results, emphasizing the potential of Augmented Reality (AR) to change and transform traditional educational practices (Khan et al., 2019). Through creating interactive and immersive learning environments, Augmented Reality (AR) technology offers unique opportunities for students to engage with complicated concepts and enhance their understanding of different subjects.

In conclusion, across most industries, the Augmented Reality (AR) technology has brought new era and opportunities to create new and enhance existing users' experiences. Its benefits are being seen in every corner of learning and work, from healthcare to education, hospitality to retail. Augmented Reality (AR) usage across various industries shows the promise to change how end-use information is presented, accessed, and used by users and customers. There is a lot more research and development work ahead in Augmented Reality, and researchers have just scratched the surface when it comes to combining Augmented Reality (AR) with day-to-day experiences. It is all set to revolutionize how users interact with the virtual and real worlds. AR will open the door to a future where the digital and real worlds will co-exist.

2.4 Mixed Reality (MR)

MR, often linked with XR (Extended Reality), faces challenges in precisely defining its classification within the spectrum of virtual experiences. Milgram and Kishino introduced a widely recognized continuum, positioning mixed reality as an umbrella term that merges elements from both the real and virtual worlds. However, other scholars have contested this interpretation. Notably, scholars such as Rauschnabel et al. (2022) propose an alternate view, suggesting that mixed reality represents a distinct reality, situated between augmented reality (AR) and "augmented virtuality (AV)".

The study's perspective aligns closely with this latter interpretation of MR. In essence, MR bears a stronger resemblance to AR than to virtual reality (VR). It fundamentally focuses on augmenting the real world with virtual elements, resulting in an amalgamation of these two domains. However, what distinguishes MR from AR is its emphasis on endowing users with the ability to not only passively observe but actively

interact with and influence the virtual objects within the environment. This interactivity and capacity for influence mark a defining feature of MR (OneOrigin, 2022).

Apple Vision Pro headset often referred to as spatial computing (Roberts, 2024). Functionally, it closely mirrors the essence of MR. This innovative device offers access to both realities and uses Apple's distinctive marketing terminology to describe different experiences. In this context, 2D applications are referred to as "windows," 3D objects as "volumes," and fully immersive VR experiences as "spaces."

The ability to interact with and influence virtual objects reinforces the unique identity of MR within the spectrum of extended realities, illustrating its position as to link between the actual physical world and the digital world, offering a compelling and interactive blend of both realms.

2.5 Virtual Reality (VR)

VR can be defined as the user is fully immersed in a world that is imposed over the real one, VR as a concept has always been available in one form or another. While the concepts of engaging in a technology-driven, fabricated reality go back to early science fiction and fantasy novels, the first approaches to VR were in fact panoramic paintings that sought to fill an individual's field of view and make the viewer feel as if he/she was embedded in the scene (Rauschnabel et al., 2022)

Whereas panoramic paintings utilize foreshortening to create a feeling of presence in a scene, stereoscopic photo viewers more effectively used this concept to create a realistic perception of existing. Rauschnabel et al. (2022), a distinguishing factor between VR and the other realities that were expanded on previously would be that

VR replaces the physical world around you with a virtual one; AR and MR, on the other hand, augment the real world with the virtual layer that it introduces.

Other examples of VR that are actually closer in usage to the ones available these days would be the Link Trainer application used to train pilots before and during World War II Rauschnabel et al. (2022), there is also VRML (Virtual Reality Modeling Language) that was available in 1994 and allowed users to swim in the web data, and a more relevant example regarding a commercially available VR experience would be the Second Life game. (Flores-Galea, 2023)

Nowadays there are multiple examples of VR devices that can be called 'head-mounted displays' (HMDs), they are being developed and produced by several companies that vary in size. This study will focus on the two most established known devices (Oculus, VIVE) in addition to the device used for the study (Oculus Quest 2).

These devices started to gain traction after the introduction of the Kickstarter for the first Oculus device and the eventual acquisition of it by Meta, these devices were first made for simple purposes. These 'head-mounted displays' (HMDs) were initially designed for gaming and entertainment, but usage has gradually broadened to include areas like job training, prototyping, marketing, and tourism. Rauschnabel et al. (2022).

Furthermore, the study will reflect on the Oculus device and how it improved through the newer iterations compared to its beginnings. Afterward, an introduction to various virtual worlds and applications that exist, in addition to their importance for the metaverse will be discussed. Moreover, the change in the communication process will be discussed.

The Oculus Quest 2 is mainly a VR capable headset, that has minimal MR features, which include the ability to view the real world worn by users and allows the user to designate an area of virtual border. VR has been used mainly in gaming and trainings in addition to utilizing it in fields such communication, education, art, entertainment, and tourism.

2.6 Metaverse

The phrase "Metaverse" debuted for the first time in the novel Snow Crash, which was released in the year 1992. Neal Stephenson, the author of Snow Crash, conceived of a three-dimensional virtual realm that anybody could join and use virtual avatars to engage in conversation with other individuals as well as with the artificial intelligence system.

The concept of the metaverse is constantly evolving, which is why the scientific community has agreed on different iterations. These iterations are used to redefine the concept, add more features, and incorporate and adapt previous concepts. In the book Journey to the Metaverse: Technologies Propelling Business Opportunities by Flores-Galea (2023), the following iterations are pointed out:

1) The first Iteration of the Metaverse: Web 3.0 2) The second Iteration of the Metaverse: Multi gaming. 3) The next Iteration of the Metaverse: The True Metaverse

For a more formal definition of the Metaverse, Stylianos Mystakidis's defined the Metaverse in the Encyclopedia as “The post-reality universe, a perpetual and persistent multiuser environment merging physical reality with digital virtuality”. The definition is based on the merge between technologies that allows interactions through senses with the virtual environments, digital objects, and individuals as viewed in virtual reality (VR) and augmented reality (AR).

Accordingly, the Metaverse can be viewed as an interrelated web of social, networked immersive environments in persistent multiuser platforms. It enables user communication in real-time and dynamic interactions with digital artifacts. Mystakidis (2022) suggested that the first iteration was a web of virtual worlds in which avatars were able to teleport between the worlds. The modern iteration of the Metaverse contains social, VR platforms that allow massive-multiplayer online video games, open game worlds, and AR collaborative spaces. As Song Z. (2022) stated in his article that was based on the information that was provided by Zimi Lab and published by Beijing University Press under the title: Illustrating the Metaverse, designing the Metaverse (2022), there is no standard conceptual definition of the metaverse. However, he acknowledges that in order for something to be considered a metaverse, it would need to be based on four core properties.

These properties include: 1) The metaverse virtual space and the real world together to maintain a high degree of synchronization and intercommunication, interaction effects that are close to the real world. 2) Users have the ability to engage in autonomous invention and creation inside the Metaverse by utilizing open-source technologies and platforms. This allows them to construct a virtual environment that is unique to themselves. 3) The Metaverse will function in an open-source way and will continue to develop endlessly during its existence. 4) An economic system that operates in a closed-loop fashion.

There are several metaverses being constructed. The one being produced by Meta (Metaverse) is receiving the most public recognition; however, the Metaverse being developed by HTC (Viverse) should also be considered a good competitor for them (Viverse, n.d.). Flores-Galea (2023) also identified nine potential ways of usage for

the Metaverse when the technology matures: Entertainment, Travel, E-commerce, Workplace, Media, Education, Gaming, Military, Dating and relationships.

2.7 VRChat

Prior to exploring VRChat, it is essential to discuss Social VR as both subjects intersect and complement each other. Social VR as defined in a book written by Flores-Galea (2023) called *Journey to the Metaverse: Technologies Propelling Business Opportunities* suggests that social VR is the future of social media. Researchers are keen that social media will be an effective tool in the Metaverse which will allowing users to interact with each other as avatars in the virtual world, in addition to communicating and collaborating in a manner similar to actual worlds.

VRChat is a popular virtual reality social platform where users can create their 3D avatars by themselves, explore virtual worlds, and interact with other users in real time. The system of VRChat is designed to be user-friendly and intuitive, with a focus on ease of use to enhance the overall user experience. VRChat is mainly used through VR headsets however, the usage of the VRChat without the headsets was enabled while using them in desktop mode. Several areas for which the platform to be used were defined as individuals can use them to socialize, develop games and music or for dancing performances (Flores-Galea, 2023). One factor that influences perceptions of ease of use in VRChat is the user interface design. A well-designed and intuitive interface can make navigating the virtual world and interacting with other users a seamless experience. Additionally, the availability of helpful tutorials and guides within the platform can also contribute to the perceived ease of use. Finally, the performance and stability of VRChat, including quick loading times and minimal lag, can greatly enhance the ease of use and overall satisfaction of users.

The social environment in VRChat also plays a crucial role in the overall user experience. The ability to connect and communicate with other users in a meaningful and enjoyable way is essential. Features such as voice chat, emoticons, and interactive gestures can create a more immersive and engaging social environment. Furthermore, a supportive and inclusive community within VRChat can foster a sense of belonging and encourage users to explore and interact with others. Ultimately, a positive social environment can greatly enhance the overall satisfaction and enjoyment of using VRChat, “VRChat, in particular, is a social VR environment that has fostered a great deal of user innovation in the area of social rituals” (McVeigh-Schultz & Isbister, 2021).

McVeigh-Schultz & Isbister (2021) also points out that due to the limited and sometimes missing physical feedback inherent with this technology like hugging, users have started to emphasize other cues to convey emotions, “some users in VRChat utilize the auditory feedback of kissing sounds as a greeting ritual to say hello and goodbye to friends (McVeigh-Schultz & Isbister, 2021).

In this thesis, special attention was set on VRChat, which will be the platform of use. However, as it is essential not to overlook or neglect to mention some of the other well-liked and popular social VR platforms, such as AltspaceVR, Mozilla Hubs, Cluster, and big screen, this study will discuss the matter in detail.

AltspaceVR is a social VR platform acquired by Microsoft in 2017. It consists of user-generated virtual worlds and specializes in hosting live virtual events. The platform's elements are now part of Microsoft Mesh, an experimental VR collaboration suite. Some examples of the events hosted there would be business conferences and magic

shows. Similar to VRChat, AltspaceVR is a VR platform where people can gather, communicate, collaborate, and engage in virtual group activities.

Mozilla Hubs is an open-source Social VR platform created by the web browser Mozilla. It is a chatroom compatible with numerous VR hardware due to its use of web standards WebXR to deliver virtual 3D content. Cluster is also similar to VRChat due to how it also uses virtual worlds that have been created by the community and cluster itself to bring players together so that they can interact and explore together, Cluster have a manga esthetics, and is mostly used in Japan.

2.8 Theoretical Framework

For the aim of this study, Technology Acceptance Model and Experimental Research Design were discussed to analyze their eligibility to be incorporated to the study. TAM is going to be the main theoretical framework for this study. experimental research design, on the other hand, will not be the main theoretical framework of use. However, it was essential to embed it in the study due to its importance in providing valuable insight into the study of cause-and-effect relationships. Moreover, the method's importance will be discussed in the future recommendations and implementations of the study.

2.8.1 Technology Acceptance Model

Technology Acceptance Model (TAM) originated from the work of Davis in 1986 and has since become a widely used model in the field of information systems and technology adoption. Davis initially proposed two key factors for user acceptance: perceived usefulness (PU) and perceived ease of use (PEOU), with perceived ease of use (PEOU) having a major and direct effect on perceived usefulness (PU). According to TAM, these factors are what directly influence users' behavioral intentions, and

eventually the adoption of the technology. (Chuttur, 2009).

Over the years, TAM has undergone some changes, modifications, and extensions by Davis and other researchers that have led to the enhancement of its applicability and explanatory effectiveness, these enhancements over time have led this model to be so popular that it has been cited in most of the research done about users' acceptance of technology (Lee, et al., 2008).

Davis in another study later found a correlation between perceived usefulness (PU) and actual system use (ASU), with another correlation between the influence of the system's characteristics and the attitude towards using the system. (Chuttur, 2009).

(Chuttur, 2009) further describes the two important expansions that were applied to TAM, the first one was TAM2 which was conducted by Venkatesh & Davis in the year 2000 in which they proposed adding new variables that can be antecedents to the perceived usefulness (PU) variable in TAM.

One of the most important extensions of TAM was proposed by Venkatesh, who was interested in identifying antecedents to the variable perceived ease of use of the model (Marangunić, N., Granić, A, 2015), Two main groups of antecedents for the perceived ease of use were identified: anchors and adjustments. The anchors were considered as general beliefs about computers and computer usage, whereas the adjustments were considered as beliefs that are shaped based on direct experience with the target system. In both groups, Venkatesh proposed several determinants that were mostly derived from previous research related to the detection of the antecedents to the perceived ease of use (Marangunić, N., Granić, A, 2015).

2.8.2 Media Richness Theory

Media richness theory proposes that different communication media possess varying degrees of richness that influence their effectiveness in conveying information and facilitating shared meaning (Kock, 2005). The media richness theory suggests that the richness of a media medium is determined by its ability to convey immediate feedback, provide feedback cues like body language, allow message customization for specific recipients, and its ability transmit the emotions or feelings of the communicators (Li et al., 2012).

The central tenet of media richness theory is the idea that the richness of a communication medium plays a crucial role in determining its appropriateness for different tasks (Burke et al., 2001). This theory highlights that media vary in their capacity to reproduce information, with richer media being more adept at conveying both intended and symbolic information related to the message and the sender (Kuyath & Winter, 2019). Moreover, media richness theory suggests that the perceived richness of a communication medium is influenced not only by its inherent characteristics but also by individuals' experiences with the medium (Armengol et al., 2015).

Media richness theory is instrumental in understanding how different communication channels impact various outcomes. For instance, research has explored how media richness influences customer loyalty in mobile instant messaging applications, demonstrating the theory's relevance in the context of consumer behavior and relationship management (Tseng et al., 2017). Additionally, investigations into the effects of media richness on organizational communication practices have highlighted the theory's significance in shaping information processing and decision-making within companies (Gilman & Turner, 2001).

Moreover, it is considered as a foundational framework for understanding the complexities of communication in diverse contexts. By emphasizing the importance of selecting appropriate communication media based on their richness and suitability for specific tasks, this theory offers valuable guidance for practitioners and researchers seeking to optimize information exchange and enhance communication outcomes in a digital age.

Chapter 3

METHODOLOGY

This chapter discusses the research methodology, design, context, population, sampling, data collection procedure and instrument, research procedures, and reliability and validity.

3.1 Research Methodology

For the purpose of this study, the methodology used was qualitative in order to attain deeper knowledge of the effect of VR user experience on communication, taking into consideration engagement, past experience, visual elements, distractions, and emotions of VR experience toward communication.

Qualitative research methods encompass a number of philosophical perspectives and approaches that researchers use to make their work available to analysis and critique (Vaismoradi et al., 2013). These methods are identified by their Individualistic characteristics, focusing on the individual experiences and meanings, in contrast to quantitative approaches that use and emphasize standardized methods and large sample sizes (Morrow, 2005). Over time, qualitative research has evolved significantly, with psychologists historically emphasizing experimental and correlational methods (Levitt et al., 2018).

The use of qualitative methods in research has been very important in the fields of psychology, nursing, and various other fields, offering a tool and means to explore

complex social phenomena that may not be quantifiable (Keith et al., 2022). Qualitative research designs are especially valuable when there is a gap in knowledge or when little is known about a specific phenomenon (Driessnack et al., 2007). These designs help researchers to gain a deeper understanding of the relationships and contexts that influences multiple aspects of health and well-being (Felner & Henderson, 2022).

Research skills, emphasizing the importance of a systematic and well-thought-out approach to study design and data analysis are all essential aspects for researchers (Köhler et al., 2021). By using and integrating qualitative methods into study designs, researchers can develop a more nuanced and accurate understanding of the human experiences and behaviors (Felner & Henderson, 2022).

To conclude, qualitative research methods play an important role in researching and exploring complex social Occurrences and phenomena by giving researchers the means to delve into individual experiences and meanings. By sticking to methodological standards and embracing diverse qualitative research designs, researchers can enhance the depth of their studies, thus contributing valuable insights to various fields of inquiry.

Among the various methods of data collection for qualitative research including focus groups, observations, surveys and interviews, the interview method is considered to be the most preferred method due to its many advantages and strengths (Sincero, 2012) as it allows samples to be controlled in addition to having the data collected directly from the individual in study (Clements, 2021). For this research, the semi-structured interview technique was decided for this study as the best fit for examining the research

questions for this research since the research is based on answers related to an actual user experience.

As the study was based on semi-structured interviews, a set of questions related to social presence and ease of interaction, in addition to group and interpersonal communication experiences, were asked to individuals regarding their first time VR experience, and their answers were added to a coding sheet created to measure analyze the experiences based on the answers post the VR experience, the sheet was created after grouping similar experiences together and generating a set of fixed variables in which will be considered as the main pillars of the study. A semi-structured interview is a “qualitative research method that involves oral communication with individuals in a way that is self-conscious and based on a partially structured methodological course” (as cited in Petrescu et al., 2017; Longhurst, 2010, p. 112).

The interviews were conducted within the Eastern Mediterranean University campus; the total number of members interviewed was 30 participants. Furthermore, the variables of the model were analyzed, and findings were established based on the results. A detailed description of the methodology of the model used within the study will be discussed within the Chapter Two.

3.2 Research Design

This research was conducted to generate and understand relationships between engagement, past experience, visual elements, distractions, and emotions of VR experience and their effect on VR communication for Gen Z.

A semi-structured interview will enable exploring the participants’ experiences, perceptions, and communicational experience in depth, providing rich and detailed

information. Interviews will be conducted with a randomly selected sample of participants that fall within the age band 18-25 years old, allowing us to deeply understand their perspectives on the topic under investigation.

Replicability is particularly important for study that looks at facts that can be measured or counted. When collecting other types of data to answer questions about personal or social meaning, the need to be able to record real-life events is essential, which are different from one person to another (Little et al., 2014)

Semi-structured interviews were tackled by Hammarberg et al (2016) stating that this method is used when beliefs, attitudes and concepts of normative behavior are in question. Taking the above into consideration, the study was based on this methodology as it serves the purpose of the study.

It was later suggested within the same study that the main purpose for this method is that it can interpretate case studies, emotions, perceptions, and personal beliefs of individuals which allows for a flexible analysis and interview process in addition to allowing the interviewer to go through follow up questions and deeper analysis.

Semi-structured interviews are an important qualitative research method that allows for flexibility and in-depth study and exploration of participants' experiences, views, and perspectives (Oerther, 2021). This approach involves developing a set of open-ended questions to guide the interview while also allowing for spontaneous responses (Baumbusch, 2010). Researchers can use semi-structured interviews to collect reliable and valid data in multiple fields, such as healthcare, business, communication, and education (Naidoo, 2024). These interviews help provide a balance between structure

and flexibility, making them well-suited for capturing rich and diverse information (Banerjee et al., 2022).

The nature of semi-structured interviews enables researchers to craft questions to each participant's experiences, ensuring a personalized and comprehensive data collection process from the participants (Wingrove et al., 2021). Furthermore, semi-structured interviews also give the advantage of allowing for follow-up questions, which can lead to deeper and more meaningful insights and clarification on specific subjects and topics (Kimbrel, 2021). Semi-structured interviews have been used effectively in diverse settings, including healthcare, engineering, and social sciences, to gather detailed and meaningful information (Lindsay et al., 2020).

Moreover, semi-structured interviews have been very important in exploring complicated topics like work-life balance, healthcare practices, and educational perspectives (Girişken, 2021). By conducting these interviews, researchers can dive into the nuances of participants' thoughts and behaviors, providing a nuanced understanding of various phenomena (Pritchard et al., 2016). Furthermore, semi-structured interviews have also been used in studies that focused on best practices, leadership, and organizational dynamics, proving, and showing its versatility and its ability to be used across different research domains (Ibrahim, 2019).

Another advantage for semi-structured interviews is that it is applicable to the relatively small sample size which was another factor for adopting this method within the study.

However, it is important for researchers to carefully plan the interview questions and establish clear guidelines to ensure consistency and reliability in data collection. Overall, the semi-structured interview method offers numerous benefits for researchers seeking in-depth insights and a nuanced understanding of their research topic.

By using this method, the study aims to offer a comprehensive and nuanced analysis of the Gen Z user experience of communicating through VR. Furthermore, the use of the qualitative semi-structured interview method will allow for a more holistic understanding of the participants' experiences. By delving into their perceptions and emotions, the nuances and complexities of their thoughts on the topic can be captured. Overall, the methodology chosen for this thesis is perceived to expand the understanding in this field.

3.3 Population and Sample

The study will include a random sample of Eastern Mediterranean University students aged between 18-25 years old, consisting of thirty male and female Gen Z participants who participated in the study after agreeing to conduct the experiment in a lab located within the university's campus. Gen Z, also known as Generation Z, refers to the individuals born approximately between the mid-1990s and the early 2010s. This generation is characterized by being the first truly digital-native generation, particularly since the internet, which was already prevalent and widespread, unlike previous generations who had to adapt to these technologies later in life (Magano et al., 2020). They are from different academic backgrounds and from multiple majors. This sample included a combination of graduate and undergraduate students. The ages of the participants ranged between 18 and 25, and that was the only determining factor regarding their acceptance for the study.

3.4 Reliability and Validity

This study was conducted following approval from the ethics board. All participants volunteered and participated willingly and were required to sign a consent form prior to the commencement of the sessions. The consent form explicitly outlined the use of audio recordings for the interviews and provided participants with the option to request the destruction of their collected data at any time. No other personal data was solicited from the participants. To ensure the dependability of the findings, all interviews were audio-recorded and transcribed verbatim. One researcher coded the transcripts, and any discrepancies were resolved through discussion.

Chapter 4

ANALYSIS AND FINDINGS

This chapter is the analysis and finding section of the research and will present the data produced from the semi-structured interviews that were conducted and transcribed to analyze the data. The coding sheet was adapted and generated based on the coding sheet developed by (Oguafor & Nevzat, 2023) due to the usage of an inductive approach to identify important words and sentences.

4.1 Coding

Data collected in this research were first analyzed by transcribing an audio-recorded session of the interviews to generate codes to discuss the research questions by following an inductive approach to identify important sentences used by the participants when answering the interview questions (See Appendix A), which produced three titles, the first title social presence which included answers correlating to (focus, special awareness, and virtual elements) as they relate to the first research question, and answers containing the words (distractions, control, and effort) were categorized under the second title Ease of interaction as they relate to the second research question. Lastly, the answers that contained words and sentences relating to (emotions, excitement, communication experience, engagement, initiating conversations, and the willingness to repeat) were categorized under the third and last title, communication experience, as they relate to the third research question.

Table 1: Coding Sheet Source: Adapted from Oguafor, I. V., & Nevzat, R. (2023).

QR	Codes	Defenetion	Meaning of the code	Text segment
Social Presence	1. Focus 2. spatial awareness 3. Virtual elements	The extent of social presence experienced from Communicating in VR	Identifying the factors that attracted participants to their VR communication experience, including how they perceived this experience and interpreted non-verbal cues.	"I was pretty focused because like the visuals and everything made me like concentrate on what I was doing and like I was concentrated on where I wanted to go and move around " "The characters and how they looked, they looked as if they were from a fictional game or an anime or a movie. very appealing to me because I watch these things."
Ease of Interaction	1. Distractions 2. Control 3. Effort	What are the factors that made the communication in VE easy or hard	Identifying the ease in which participants experienced communication and what factors affected it	"The only factor that diverted was the mic issue I was having so I kept on switching out and switching in" "no, not really. I felt like I was just like chatting with some normal people"
Communication experience	1. Emotions 2.Excitement 3. Experience 4. Engagement 5. Initiating Conversations 6.Willingness to repeat	How was the communication experience in VR for the participants	Identifying how the participants felt while they were communicating in VR and how they felt afterwords	"When I tried to enter a conversation between people, they were talking about a topic midway, so it was hard for me to actually get involved and when I try to speak kind of people are ignoring as if I'm disturbing the conversation ." " " Not really. The engagement was very minimal and not direct. It was very playful." "I went up to people and started chatting with them." " I would not like to repeat the same experience but I would definitely would love to try different things if it was more interactive."

The coding sheet was created based on the answers of the Gen Z participants in the VR experience conducted within the University's campus; answers were grouped to three main categories (social presence, ease of interaction and the communication experience). Using these categories as the main pillar, three codes were generated per category.

Within the table, the main category, code, definition of the category and definition of the code were mentioned in addition to adding a sample text of the interviews to highlight the basis in which the codes were generated upon.

4.2 Data Collection and Preparation

The interviews were conducted in private with the participants in an empty laboratory each participant was given access to an Oculus Quest 2 VR headset device that was purchased for the purpose of this research and allotted a 30-minute window to use said device to log into the VRChat at the end of the session they were asked to answer the interview questions (see appendix 1).

For the aim of the study, the VR device was bought, later on it was essential to find the right audience for the experiment. Afterwards, the appropriate experience was searched and set to the device to benefit the experiment, later, interviewers selected randomly based on a previously decided age limit were able to access the device and experience the journey chosen, at last, interviewers answered the interview questions decided to support the study.

Below are two figures that summarizes the preparation and collection process (Figure 1) in addition to a screenshot from the VR experience that the interviewers experienced (Figure 2):

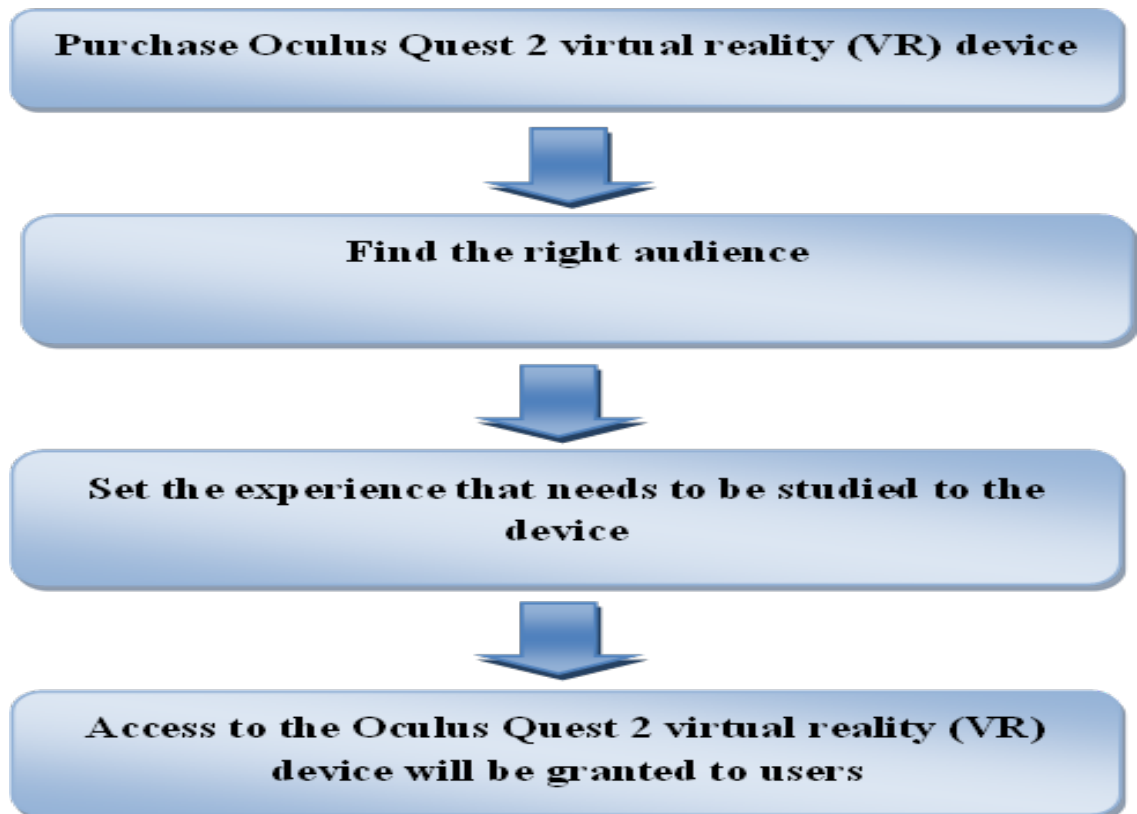


Figure 1: Interviews Design. Source: Developed for the Research



Figure 2: Screenshot from VR Chat Session. Source: Taken from the Session of VR Experience within the University's Campus

To analyze the data, an inductive approach will be used to identify patterns and codes from each interview as the main purpose of the inductive approach is to allow research

findings to emerge from the frequent, primary, or significant relations inherent in raw data, without the restraints imposed by structured methodologies. (Thomas, 2006).

Inductive research is done by starting with the data or a specific problem and deriving and finding conclusions based on observations, as opposed to starting with existing theories or hypotheses (Bansal et al., 2018). The integration of inductive reasoning in research design can lead to a more comprehensive and encompassing understanding of a phenomenon (Ali & Birley, 1999).

The inductive approach in research is very important for generating novel insights, developing theories, and making sure of the credibility of interpretations through systematic analytical discipline.

The compiled data will be stored in an Excel document, which will contribute to finding patterns that emerge in the user's experience during the experiment. By studying this sample of individuals, identification to any patterns or trends in their reactions and behaviors while using VR chat will emerge. Additionally, the interviews were analyzed, and a data pattern sheet was generated to allow for analyzing the data and finding the correlations between the answers, as shown in Figure 3 below.

Q1 Code	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24	P25	P26	P27	P28	P29	P30	Sums
communicatio n experience / frustrate		Above average Communicatio n experience	Good experience	Fun	-	-	Fun	-	-	Nice	Nice	-	-	-	-	-	Interesting	-	-	Nice	-	-	Positive	-	-	-	-	-	-	-	5
communicatio n experience / frustrate	-	-	-	-	Limited conversations	-	Mostly chaotic	Non-existent	-	-	-	Limited conversations	Unstable	Non-existent	-	-	-	-	Limited conversations	-	Not conversing communicatio n	Limited conversations	Limited conversations	-	-	-	-	-	-	-	15
communicatio n experience / frustrate	-	-	-	-	-	-	-	-	-	-	-	Good	-	-	-	-	Kind of bad	-	Kind of bad is the first part but good in the second one	-	-	-	-	-	-	-	-	-	-	nothing too special	4
Place VR communicatio n experience	-	-	-	-	-	-	-	-	-	TRUE	-	TRUE	-	-	-	-	-	-	TRUE	-	TRUE	-	TRUE	-	-	-	-	-	-	-	4
No chat in communicatio n experience	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	-	TRUE	-	TRUE	TRUE	TRUE	TRUE	TRUE	-	TRUE	-	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	26
No socially attraction element	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Visually attraction element / Graphic & Sound	The game design element	Attractive design	Some immersive environments	Some immersive environments	-	-	Attractive design and sound	-	-	Interesting worlds and design	Interesting worlds and design	Interesting worlds and design	Room design	Interesting worlds and design	-	Interesting worlds and design	Attractive design and color	-	Interesting world	Attractive design and colors	Interesting world	Interesting worlds and design	Interesting world	Interesting worlds and design	Interesting world	Interesting worlds and design	Interesting world	Interesting worlds and design	Interesting worlds and design	29	
Visually attraction element / Character & Avatar	Beautiful Character	-	-	-	Attractive Avatar	Beautiful Character	Interesting characters and avatar	-	-	-	-	-	Beautiful Character Room design	-	Beautiful Character	-	-	Beautiful Character	-	-	-	-	-	-	-	-	-	-	-	-	8
Visually attraction element	Beautiful Character & Room	Attractive design	Some immersive environments	Some immersive environments	Attractive Avatar	Everything	Interesting characters and avatar	Interesting worlds and design	Good but a bit some distract	Beautiful Avatar Room design background	Beautiful Character Room design	Beautiful background design	Beautiful Character	Interesting worlds and design	Attractive design and color	Beautiful Character	Interesting worlds and design	Everything	Interesting worlds and design	Interesting worlds and design	Interesting worlds and design	Interesting worlds and design	Interesting worlds and design	Interesting worlds and design	Interesting worlds and design	Interesting worlds and design	Interesting worlds and design	Interesting worlds and design	30		
Include your experience of VR communicatio n / Direct communicatio n	Direct communicatio n / Interaction	-	-	-	Direct communicatio n / Interaction Adding the ability	Direct communicatio n / Interaction	-	Direct communicatio n / Interaction	Direct communicatio n / Interaction	-	Direct communicatio n / Interaction	Direct communicatio n / Interaction	Direct communicatio n / Interaction	-	Direct communicatio n / Interaction	-	Direct communicatio n / Interaction	-	Direct communicatio n / Interaction	-	Direct communicatio n / Interaction	-	-	-	-	Direct communicatio n / Interaction	Direct communicatio n / Interaction	17			

Figure 3: Data Pattern Sheet. Source: Developed for the Research

The figure above shows a snapshot of the excel table developed to mark and group the similar codes derived from the answers that the participants provided to the interview questions.

4.3 Data Analysis and Findings

After collecting and analyzing the information gathered through the interviews on the Data Pattern Sheet, an analysis based on repetition per item was conducted and correlated to the research questions, producing the following results through the usage of the coding sheet.

To understand what social presence communication in VR, provide to Gen Z, the study first examined focus, special awareness and virtual elements as the main codes in the coding sheets; the relationship between the codes and what the social presence in VR provides to Gen Z are related to the second research question.

The analysis of the answers related to the code focus concluded that most of the participants were focused within their VR communication experience (25 out of 30) as in the answer as seen in Figure 4 "I was pretty focused because like the visuals and everything made me like concentrate on what I was doing and like I was concentrated

on where I wanted to go and move around." was the answer of one the female participant This code looked at how focused the participants were throughout the experience.

Accordingly, a positive correlation was found between the focus of participants within the experience and delivering effective social presence communication in VR for Gen Z.

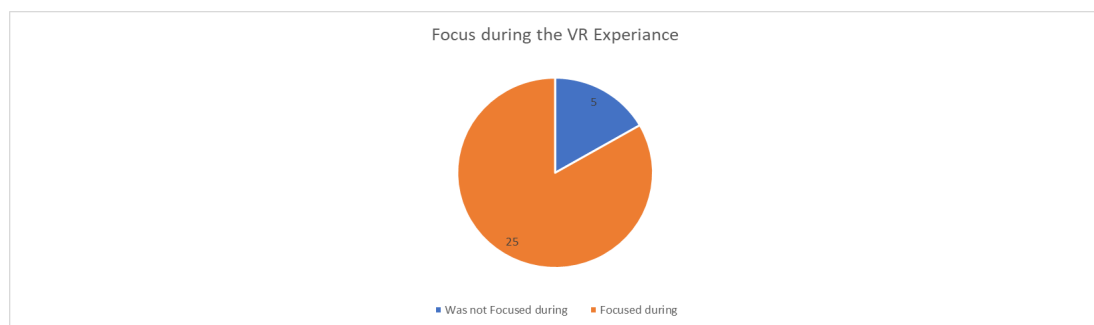


Figure 4: Focus. Source: Developed for the Research

Regarding special awareness Figure 5, the majority of the participants stated that they were aware of their physical surroundings (17 out of 30) "The VR itself shows me my limits, so whenever I pass the limits, it shows me a place that I'm past my border" was the answer of one the male participant P1, while this was how the majority replied, the number of participants that felt that they were not aware of their surroundings was still substantial (13 out of 30) "Oh, I really had no idea. Sometimes I wanted to walk around, literally, but then I have to remember that I'm in a virtual reality it's not real." is what another male participant P8 answered.

Accordingly, a negative correlation was found between the special awareness of participants within the experience and delivering effective social presence

communication in VR for Gen Z as the majority suggested that it was hard to disconnect from reality.

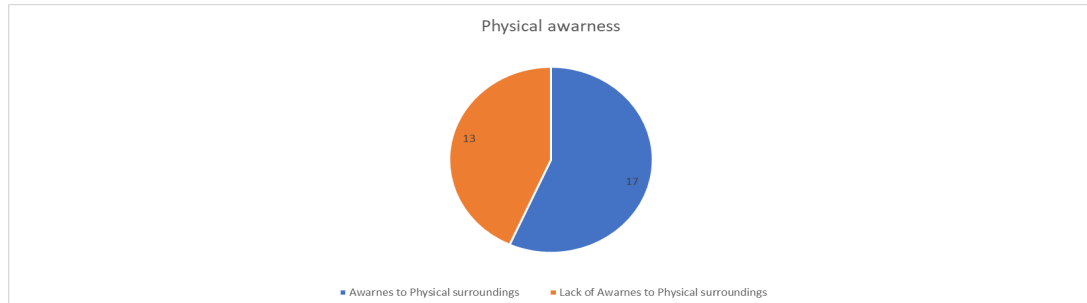


Figure 5: Physical Awareness. Source: Developed for the Research

Furthermore, in regard to the virtual elements, which are the virtual environments and avatars generated and presented in VRChat all of the participants stated that they found them attractive and interesting as they have appealing visuals built within the experience (30 out of 30) as seen in Figure 6.

Accordingly, a positive correlation was found between the perception of the virtual elements for the participants within the experience and delivering effective social presence communication in VR for Gen Z.

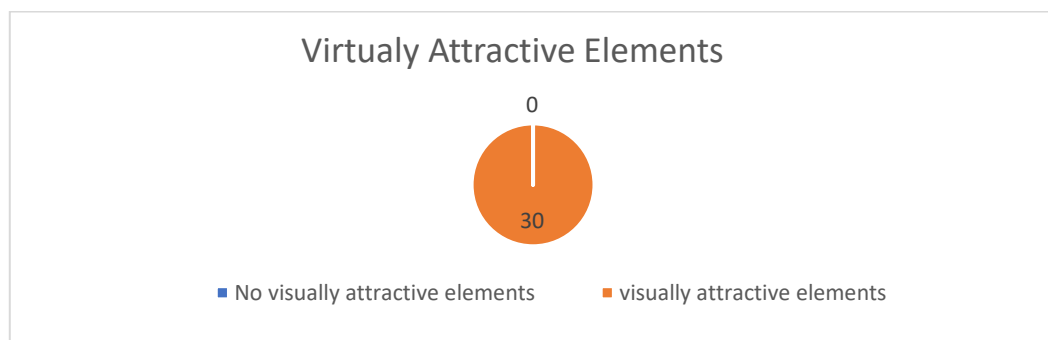


Figure 6: Virtually Attractive Elements Source: Developed for the Research

These answers pointed to two aspects they found attractive, as seen in Figure 7, With the majority stating that the graphics worlds and visuals were attractive (25 out of 30) one female participant P20 stated “Yes, actually, there was a view of a skyline on the second floor of the world I was in. It was extremely gorgeous, and I think there was snowflakes falling. So that was a very nice experience.”, and (8 out of 30) referenced the attractive element of the other users’ avatars and character designs one male participant P22 stated “The characters and how they looked, they looked as if they were from a fictional game or an anime or a movie. very appealing to me because I watch these things.”, with some touching on both in their answer as another female participant P17 stated, “Yeah, there were the attractive things, for example, like the avatar, the gaming room, the design of it”.

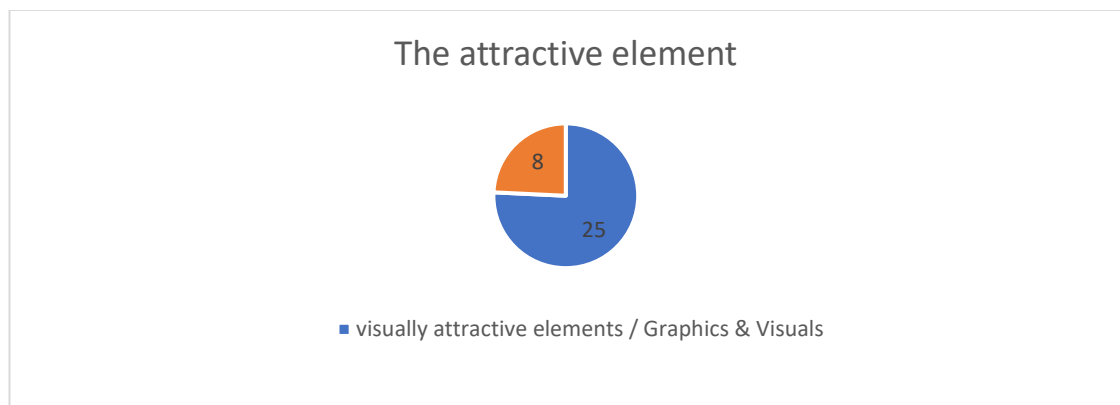


Figure 7: Virtually Designs and Attractive Characters Source: Developed for the Research

The study then examined the data regarding distractions, control, and as they were the codes generated for the second title in the coding sheet and related to the third research question.

When analyzing factors related to distractions, it was stated that the majority of the participants encountered a form of distraction while communicating in VR (17 out of

30), with some of them stating multiple distractions, as seen in Figure 8. Figure 9 will address a breakdown of the distractions.

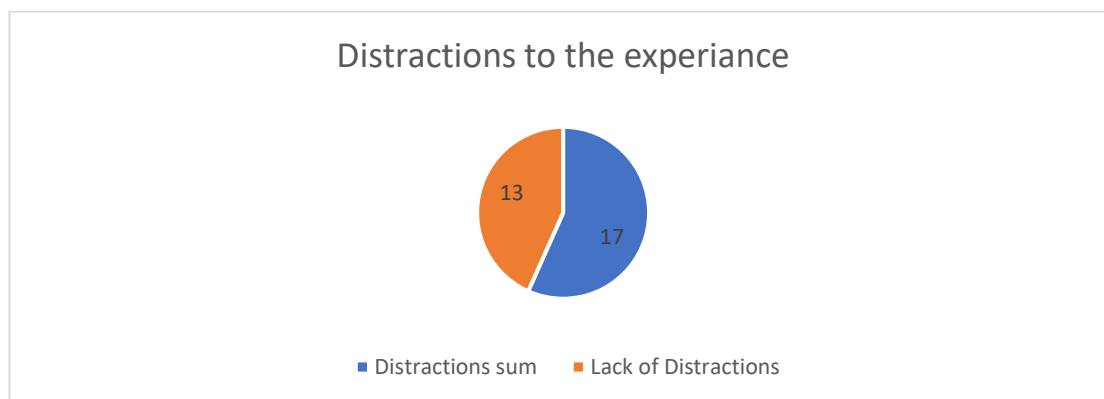


Figure 8: Distractions. Source: Developed for the Research

As shown in Figure 9 (9 out of 30) linked it to technical issues. “The only factor that diverted was the mic issue I was having, so I kept on switching out and switching in.” one male participant P4 answered while only (3 out of 30) linked it to physical distractions “I’m also again not used to it, just the feeling of kind of feeling dizzy is not, it was very weird to me, and I did not understand why.” one female participant P3 answered As for the linkage to visual distractions, only (7 out of 30) mentioned this factor “The background in one of the places I entered, it seems like it was like grass, and it was moving in such a nice way, so I just went and explored it seemed really cool” one male participant P22 answered.

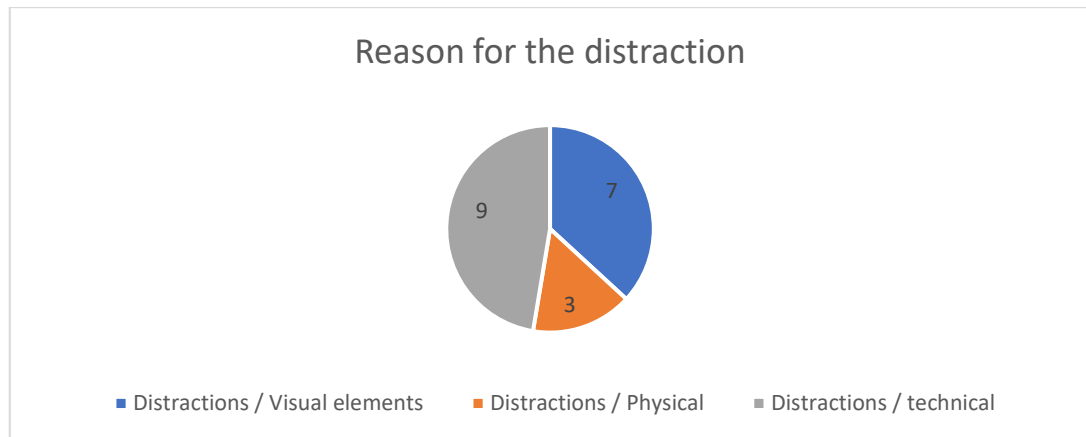


Figure 9: Reason for Distractions. Source: Developed for the Research

As for control, (17 out of 30) stated that they did feel a sense of control throughout the session as seen in Figure 10 “Yes, Control means I had a choice to leave or to come to talk or not to talk and to switch on any activity I wanted to do. The freedom was there” one male participant P4 answered, although the number of participants that did not have a sense of control was not high it was still substantial as (10 out of 30) participants stated that they lacked the sense of control “I felt like I should be careful about what I say. I can't say it freely, speak freely” one female participant P5 answered, and the last (3/30) did not have a definitive conclusion “At some times, yes” one male participant P18 answered.

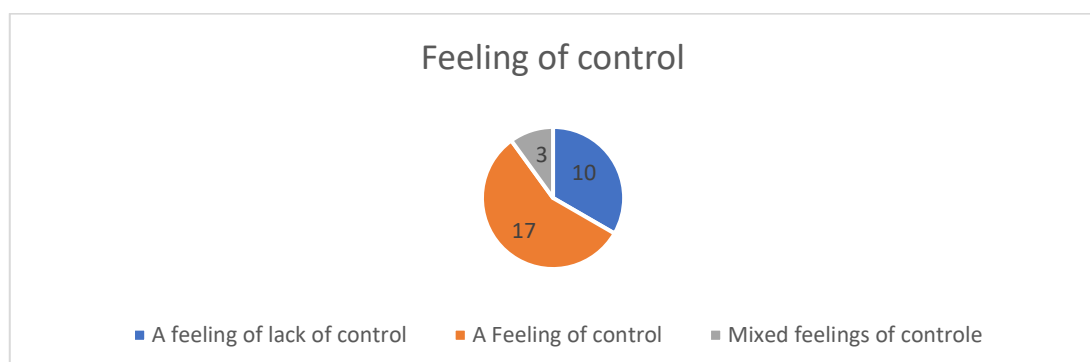


Figure 10: Control Source: Developed for the Research

Furthermore, when analyzing cognitive and emotional effort, the majority (18 out of 30) didn't perceive significant effort “no, not really. I felt like I was just like chatting with some normal people” one male participant P12 answered. Some users reported cognitive effort (5 out of 30) “I fell that it did require a lot of cognitive ah, cognitive effort Because like you have to be concentrated on what you're doing and be careful of what you say to other people” one female participant P2 answered, and a very low number of participants recognized emotional effort (5 out of 30) “yeah, it needs the emotional intelligence to know how to attract people to talk to you.” one female participant P5 answered, suggesting interaction might not always be smooth or intuitive this can be seen in Figure 11.

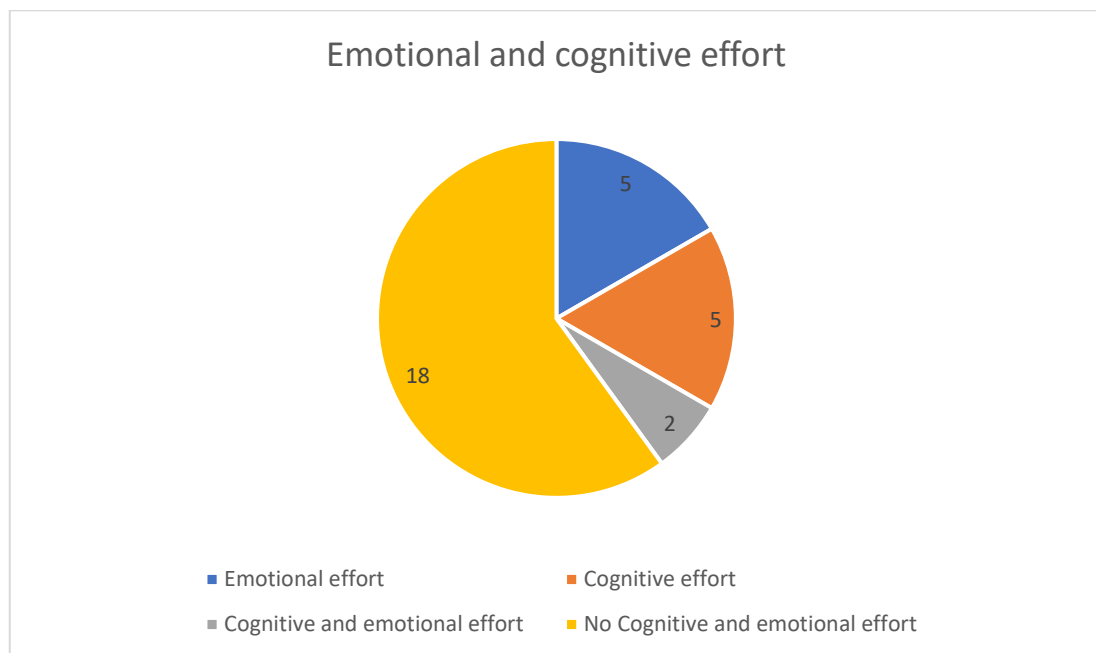


Figure 11: Emotional and Cognitive Effort. Source: Developed for the Research

Lastly, the study examined the relation of positive and negative emotions, excitement, engagement, the communication experience, the initiation of conversations, and the willingness to repeat this communication experience to answer what the Gen Z

communication experience was as they were the codes for the last title in the coding sheet and correlated to the last research question.

When analyzing excitement for VR Communication, as seen in Figure 12, the majority (20 out of 30) expressed excitement. One male participant P7 answered, “I was excited since it's a new experience, and I really liked the experience, and I'd love to repeat it.”

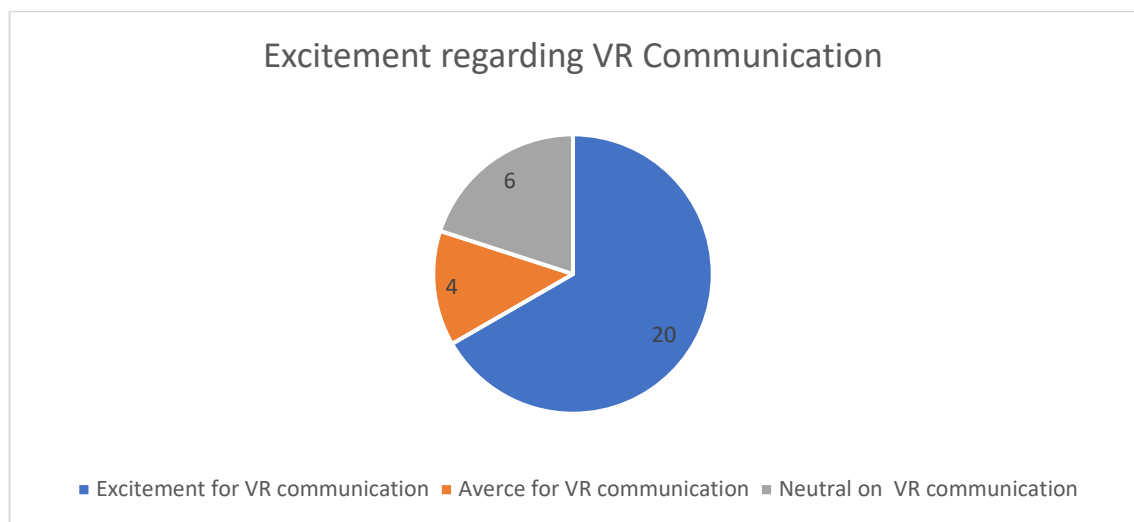


Figure 12: Excitement regarding VR Communication. Source: Developed for the Research

Regarding prior experience communicating in VR, shown in Figure 5.13 the majority of the participants never actually participated in a similar experience. (26 out of 30) Participants stated, “Actually no, this is my first time. I have never put on the headset or used any VR device.” One male participant P8 answered.

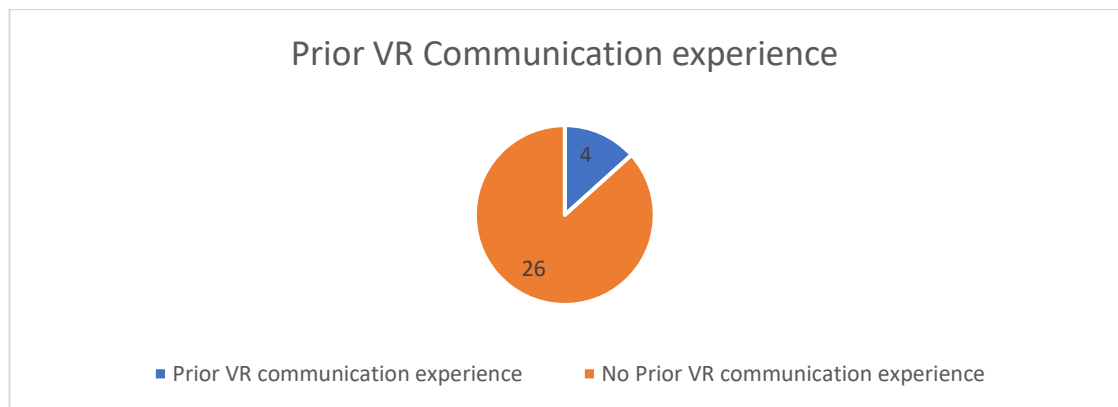


Figure 13: Prior VR Communication Experience Source: Developed for the Research

When analyzing positive vs. negative communication experiences: the majority had a negative experience when compared to typical group conversations (18 out of 30) One male participant P22 answered " When I tried to enter a conversation between people, they were talking about a topic midway, so it was hard for me to actually get involved and when I try to speak kind of people are ignoring as if I'm disturbing the conversation " as seen in Figure 14.

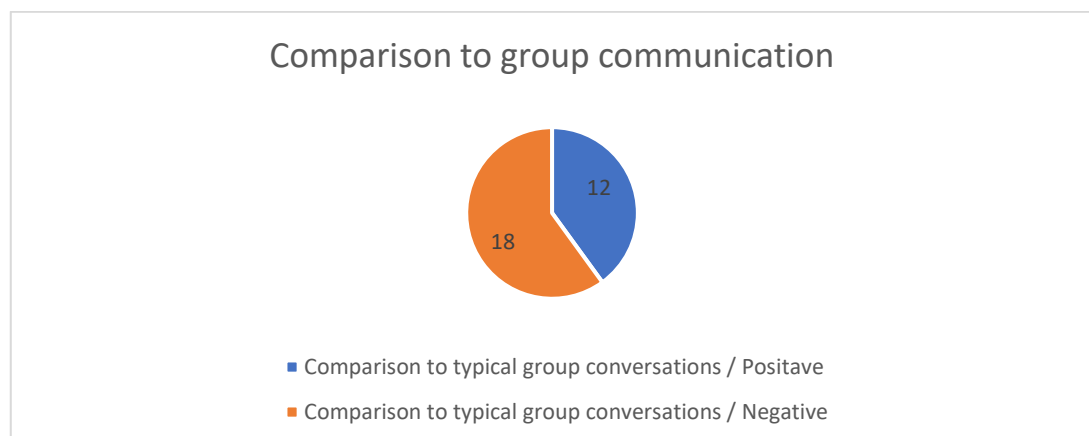


Figure 14: Comparison to group communication Source: Developed for the Research

As seen in Figure 15, limited positive experiences in communicating in VR were found (10 out of 30) "I could say it was nice. I spent half an hour in it. I talked with a few people, and I felt like I was really having fun there." One male participant P12 answered. However, the number of participants who stated that they had a negative

overall communication experience was still higher (15 out of 30), “I would go up to people and say, hi and I would get ignored. And honestly, I just spent most of the time exploring the world” One female participant P20 answered Finally (5 out of 30) indicated a mixed experience for some participants. “it was, I'm not going to say very bad, or it's good, but it was neutral or even natural.” One male participant P21 answered.

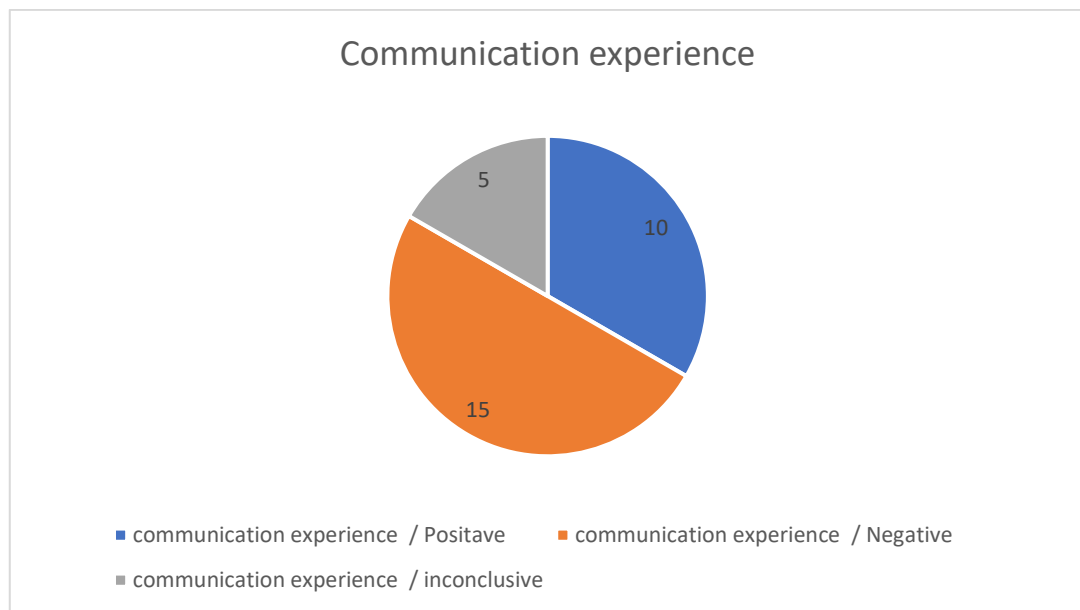


Figure 15: Communication experience Source: Developed for the Research

As shown in Figure 16 When analyzing engagement (17 out of 30) found the experience not engaging, as in the answer, “Not really. The engagement was very minimal and not direct. It was very playful” One male participant P4 answered.

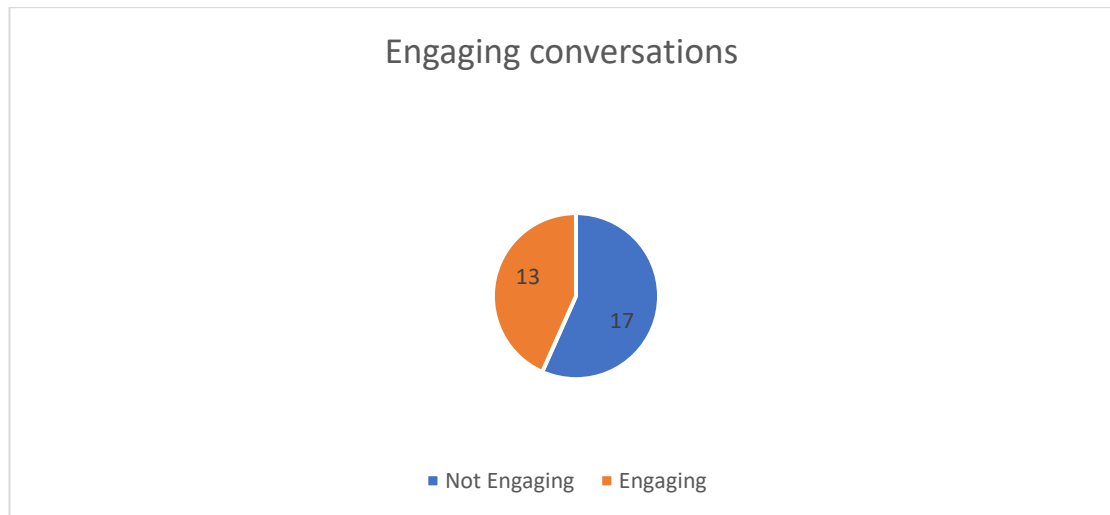


Figure16: Engaging Conversations Source: Developed for the Research

As for initiating conversations shown in Figure 17. (17 out of 30) initiated communication directly: "I went up to people and started chatting with them." One male participant P7 answered, suggesting some level of approachability for communication in VR space. However, reliance on non-verbal cues for some (13 out of 30) might indicate a hesitation to start the communication process. "I started by waving at people, till I pressed the toggle mic button and started actually communicating and they communicated back." One female participant P2 answered.

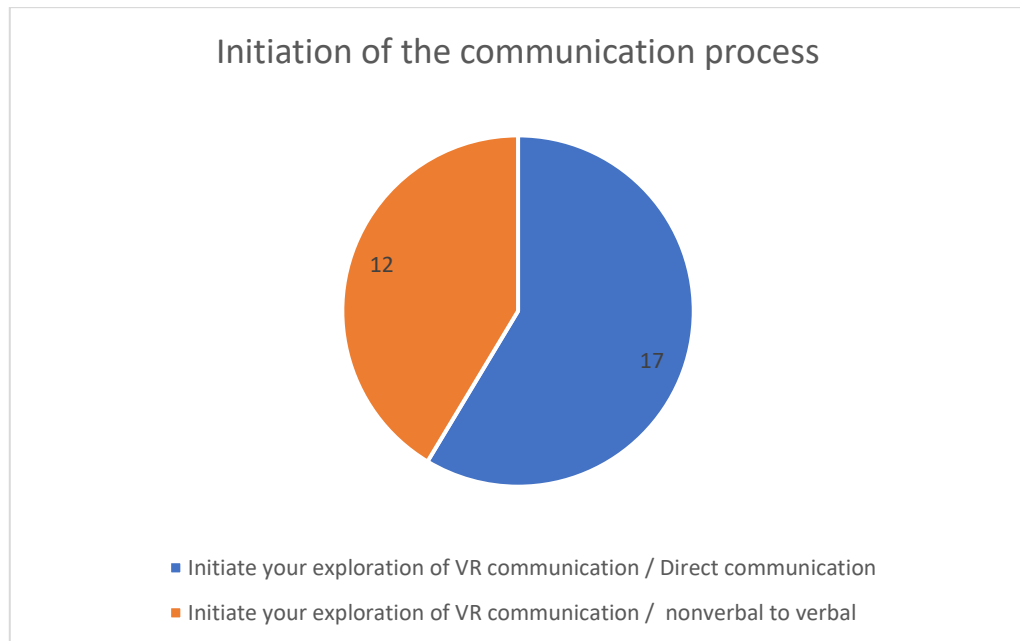


Figure 17: Initiation of the communication process. Source: Developed for the Research

While analyzing the relationship between positive and negative emotions regarding the full experience, the emotions were mostly positive in regard to the full experience (21 out of 30): One male participant P7 answered “It was positive because I liked the experience, and I'd love to repeat it, and it's something really nice to do in general.” as seen in Figure 18.

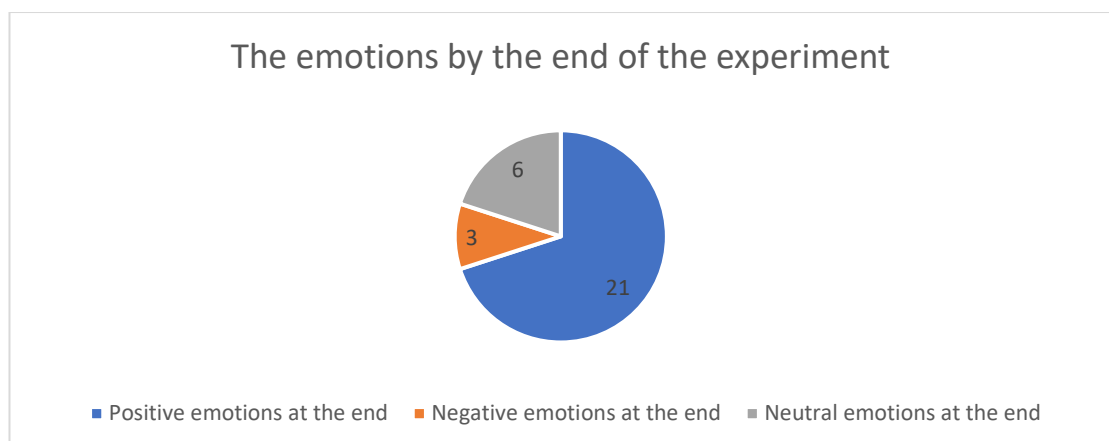


Figure 18: The emotions by the end of the experiment. Source: Developed for the Research

Lastly, when asked about their willingness to repeat this communication experience again in the future, the response of the participants was overwhelmingly positive as seen in Figure 5.19 (27 out of 30) participants stated that they would enjoy participating in a similar experience in the future “Yes, because I really enjoyed the session. I'd love to do it again.” One male participant P7 answered, and (3 out of 30) participants stated that they would try a different one “I would not like to repeat the same experience but I would definitely would love to try different things if it was more interactive.” One female participant P14 answered, and none of the participants exclaimed that they will not repeat it in the future.

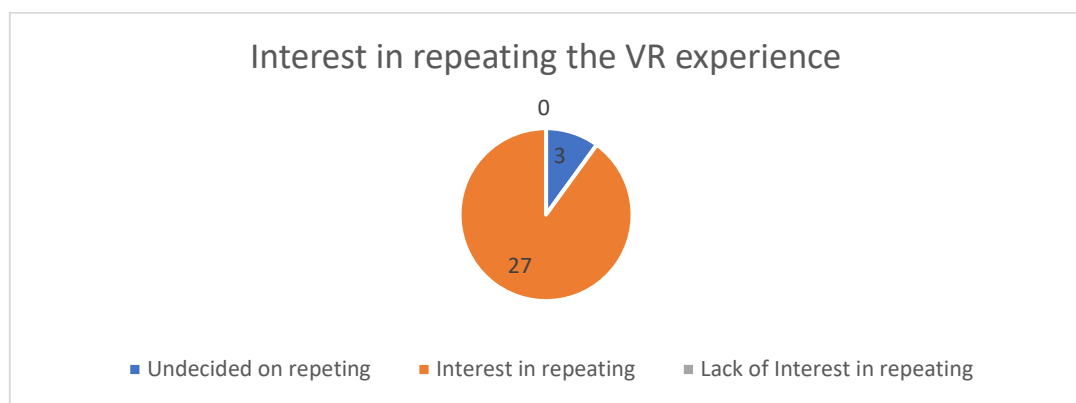


Figure 19: Interest in Repeating the VR Experience Source: Developed for the Research

When analyzing factors related to distractions, It was stated that the majority of the participants encountered a form of distraction while communicating in VR, stemming from three main reasons, the first and biggest one being technical issues, such as microphone problems can significantly hinder Perceived Ease of Use (PEOU) noting that this will interfere with the participants' experience if the technical difficulties become a frequent issue as the VR communication's effectivity will be impacted due to the frustration of the end users. While only a small number of the participants linked the distractions to physical reasons such as physical discomfort like dizziness, this type

of distraction while communicating can negatively impact Perceived Usefulness (PU) As when contributing dizziness to VR communication, users might be hesitant to interact and communicate with other people through the use of VR for extended periods. As for the linkage to visual distractions, while not overtly negative, it can still hinder Perceived Ease of Use (PEOU) for the communication experience as the virtual environment could become overwhelming, making it difficult to focus on communicating with others or distract the participants.

Based on the analysis of the interview questions, the study found that focus, attractiveness and visual elements were all factors that have a positive relationship with what social presence does communication in VR present for Gen Z. The study also suggests that VR communication are highly affected by contribution to immersion and social presence. On the other hand, the study found that the lack of awareness for Gen Z within the VR experience limited the immersion and social presence of communication.

Furthermore, the study found that the perceived ease of use is positively affected by the participants feeling of control within the experiments whereas interactions correlated negatively to the participants experience due to unclear cues and rigid interaction.

As for the affect of the VR experience of the participants emotions, the study found that a neutral correlation existed as mixed emotions were found within the analysis.

At last, the study found that VR Communication is linked to immersion, positive emotions, and willingness to repeat which suggest the potential for enjoyable and useful communication experiences.

Below is a table that summarizes the research questions, findings and the interpretation and analysis per research question:

Table 2: Finding Results

Research Questions	Code/Theme	Key Findings	Interpretation & Analysis (TAM & MRT)
What social presence does communication with VR present to Gen Z?	Focus	The majority of participants were focused during VR communication. Positively correlated with effective social presence communication.	TAM: High focus supports Perceived Ease of Use (PEOU) as users navigate VR smoothly. MRT: Focus indicates a high level of media richness, immersing users and facilitating communication.
	Spatial Awareness	Mixed results on awareness of physical surroundings. Negatively correlated with effective social presence communication.	TAM: Lack of awareness could hinder Perceived Usefulness (PU) if it disrupts the experience. MRT: Conflicting findings may suggest some users prefer richer virtual environments that disconnect them from the physical world, while others need cues to maintain a sense of control and presence.
	Virtual Elements	All participants found virtual elements attractive. Positively correlated with effective social presence communication.	TAM: Attractive visuals enhance Perceived Enjoyment (PE) and could indirectly influence PU and PEOU. MRT: Visually rich environments and avatars increase the medium's richness, leading to more effective communication

			and a stronger sense of social presence.
What was the Gen Z experience regarding the ease of interaction while communicating in VR?	Distractions	Majority experienced distractions, mainly due to technical issues, but also physical discomfort and visual overstimulation.	TAM: Technical issues severely impact PEOU and PU, as they disrupt the communication process. MRT: Distractions reduce the richness of the communication medium by diverting attention away from social interaction. Physical discomfort could also decrease the perceived richness of the experience.
	Control	Majority felt a sense of control, but a significant minority did not. Positive correlation between control and perceived ease of use.	TAM: Control is essential for PEOU; lack of control could lead to frustration and decreased PU. MRT: A sense of control allows users to better manage the rich information flow in VR and tailor it to their preferences, enhancing communication effectiveness.
	Cognitive/Emotional Effort	Most participants did not perceive significant effort. Some cognitive effort reported, with minimal emotional effort. Interactions may not always be smooth or intuitive.	TAM: Low cognitive/emotional effort contributes to PEOU, making the technology seem user-friendly. MRT: Smooth interactions indicate a well-designed interface that leverages the medium's richness for effective communication without overwhelming the user.
How was the communication experience for the Gen Z?	Excitement for VR Communication, Prior Experience, Interest in Repeating	Majority expressed excitement, most had no prior experience, and were overwhelmingly interested in repeating the experience.	TAM: Excitement and willingness to repeat show high potential for acceptance and adoption of VR communication. MRT: These positive reactions suggest that VR provides a rich and

			engaging communication medium that fulfills users' needs for social interaction in a novel way.
	Negative Communication Experiences & Engagement	Majority had a more negative experience compared to typical group conversations, and many found the experience not engaging.	TAM: Negative experiences and low engagement could decrease PU and intention to use. MRT: This suggests a need to enhance the richness of VR communication to match or exceed that of real-life interactions. Features like improved non-verbal cues, realistic avatars, and shared activities could make virtual communication more engaging and meaningful.
	Initiation of Conversations	Majority initiated communication directly, but some relied on non-verbal cues.	TAM: This suggests that the platform is relatively easy to use (PEOU), but could benefit from features that make initiating conversations more intuitive for all users. MRT: Reliance on non-verbal cues highlights the importance of incorporating these elements into VR to facilitate communication, even in a virtual environment.

Chapter 5

DISCUSSION AND CONCLUSION

5.1 Discussion

After analyzing the results, this study will discuss TAM, media richness theory and user experience when applicable to answer the research questions.

The study examined the answers provided by the participants regarding the focus of the participants, the participant's special awareness, and the attractiveness of the virtual elements in VR to answer the research question of what social presence communication in VR provides to Gen Z.

Most of the participants reported being focused during the VR communication experience, suggesting that the immersive nature of VR can effectively direct attention and create a sense of presence within the virtual environment. This aligns with the theoretical expectations of Media Richness Theory (MRT), which states that richer media, like VR, are more capable of conveying multiple cues and facilitating engaging communication. The universal appeal by the participants of the virtual environments and avatars further supports this notion, as these visually rich elements likely contribute to the feeling of being in a shared social space (Lauria, 2006).

However, the study also revealed several challenges to achieving a strong sense of social presence in VR. A notable proportion of participants reported being unaware

of their physical surroundings, potentially detaching them from the physical reality of their interaction partners.

The application of Media Richness Theory (MRT) provides a valuable framework for interpreting these findings. In the context of VR communication, the theory would predict that the immersive visuals and avatars should enhance the feeling of social presence and facilitate engaging interactions.

The findings partially support this prediction, with the attractiveness of the virtual environment and avatars contributing to a sense of social presence and the focus of participants indicating the potential for engaging communication.

Moreover, using the TAM framework, many of the participants reported being focused on the VR environment and finding the virtual elements built within the experience of the VR attractive. This suggests a level of immersion that can contribute to social presence, and a stronger sense of social presence can positively impact the perceived usefulness (PU) of VR communication. These findings align with the study by (Sagnier et al., 2020), which emphasizes the importance of presence in VR and its practical relevance for designing and evaluating virtual environments.

the study examined the answers provided by the participants regarding the distractions, control, and effort both emotional and cognitive in VR to answer the research question, answer what the Gen Z experience regarding the ease of interaction while communicating in VR.

Technical distractions can hinder the richness of VR by interrupting the flow of communication and increasing uncertainty. The lack of control experienced by some participants may also detract from the medium's richness, as it limits their ability to fully engage with the virtual environment and other users.

As for control, over half of the participants stated that they did feel a sense of control throughout the session as moving and conducting actions within the experience is based on their movements and decisions. However, the number of participants who did not have a sense of control was still substantial, as ten participants stated that they lacked the sense of control, and a number of participants did not have a definitive conclusion, suggests that this feeling of control during VR communication could be linked to perceived ease of use (PEOU).

The lack of control experienced by some participants may also detract from the medium's richness, as it limits their ability to fully engage with the virtual environment and other users. This aligns with MRT's principle that a sense of control and agency are crucial for effective communication in rich media.

Furthermore, when analyzing cognitive and emotional effort, the majority of the participants didn't perceive significant effort. In contrast, some participants reported having cognitive effort while communicating in VR, and another low number of participants recognized emotional effort while they were communicating in VR, suggesting interaction might not always be smooth or intuitive. Most did not perceive significant effort, suggesting that VR communication can be relatively easy for certain users. This finding positively correlates with the perceived ease of use (PEOU).

The cognitive and emotional effort reported by some participants may be related to the novelty of VR communication. Users may need to adapt to new communication norms and develop strategies for managing the sensory input and social dynamics of virtual environments. From an MRT perspective, this cognitive load could be attributed to the medium's richness itself. While VR offers a wealth of information and cues, processing and interpreting these cues can require mental effort, especially for those who are not yet accustomed to the medium.

In terms of emotional effort, the immersive nature of VR can trigger strong emotions, both positive and negative. This aligns with MRT's notion that richer media can evoke stronger emotional responses due to the increased presence and immediacy of the communication experience. The emotional effort reported by some participants could be attributed to the need to manage these emotions and navigate the complexities of social interaction in a virtual setting.

Lastly, the study examined the participants' answers of positive and negative emotions, excitement, engagement, the communication experience, the initiation of conversations, and the willingness to repeat this communication experience to answer the research question of what the Gen Z communication experience was. When analyzing excitement for VR Communication, the majority of the participants expressed excitement. This shows the potential for this technology to create positive emotional experiences that correlate positively to Perceived Usefulness (PU). Regarding prior experience communicating in VR, the majority of the participants never actually participated in a similar communication experience.

When analyzing positive vs. negative experiences, the majority had a negative experience compared to typical group conversations. Although limited positive experiences in communicating in VR were found, the number of participants who stated that they had a negative overall communication experience was still higher. A small number of the participants indicated a mixed communication experience for some participants.

As for engagement, over half of the participants found the communication experience non-engaging. Considering these findings, they indicate that engagement and perceived negative interpersonal and group communication experiences could hinder Perceived Usefulness (PU).

As for initiating conversations, more than half of the participants-initiated communication directly, suggesting some level of approachability for communication in VR. However, the reliance on non-verbal cues for some of the participants might indicate a hesitation to initiate the communication process.

This may be attributed to the lack of non-verbal cues in VR compared to face-to-face interactions, as explained by Media Richness Theory. The absence of subtle nuances in facial expressions, body language, and vocal tone, which are crucial for effective communication, may hinder engagement in VR conversations.

While analyzing the relationship between positive and negative emotions regarding the full experience, the emotions were mostly positive in regards to the full experience with more than two-thirds of the participants stating as such.

Lastly, when asked about their willingness to repeat this communication experience again in the future, the participants' response was overwhelmingly positive. Almost all of the participants stated that they would enjoy participating in a similar experience in the future. None of the participants exclaimed that they would not repeat it in the future, and only three were not sure.

The findings on the communication experience for gen-Z in VR offer contradictory results but a positive outlook for the future, through the lens of User Experience (UX) and Technology Acceptance Model (TAM).

From a UX perspective, the majority of the participants expressed excitement about VR communication, suggesting positive anticipation for the technology's potential; as for the willingness to repeat despite the negative interpersonal and group communication and lack of engagement aspects encountered by the participants, which necessitates UX improvements for new users, especially since most of them wanted to try communicating in VR again in the future suggesting a positive UX overall experience, to support this conclusion, it can be discussed that the participants reporting positive emotions at the end of the experiment highlights VR communication's potential to be enjoyable.

Furthermore, when cross-referencing the findings with the TAM model, it was found that negative experiences and interacting difficulties negatively impact Perceived Usefulness (PU). Conversely, the willingness to repeat the experience suggests the potential for future improvements to enhance PU. This aligns with (Kim et al., 2021) findings which suggested that positive experience is correlated positively with perceived usefulness.

Finally, regarding Perceived Ease of Use (PEOU), the participants' limited prior experience and unclear communication cues might hinder PEOU. VR communication needs to be more intuitive and user-friendly for new users.

As for the media richness theory, VR, with its immersive visuals and interactive elements, can be considered a relatively rich medium. However, the findings suggest that the richness of the medium does not automatically guarantee positive communication experiences.

One possible explanation for this discrepancy lies in the limitations of VR in conveying non-verbal cues and social presence. While VR allows for visual representation of avatars, it may not fully capture the subtle nuances of communication that are essential for building rapport and understanding. This limitation could contribute to the negative emotions and difficulties in engagement experienced by some participants.

Lastly The answers for each of the research questions above allow us to discuss the main research question How does Virtual Reality affect Gen Z communication experience?

The study's findings reveal a complex relationship between media richness and user experience. While the attractiveness of virtual environments and avatars contributes to a sense of presence, the fact that many participants encountered technical difficulties, lack of control, and challenges in interpreting non-verbal cues can hinder engagement and ease of interaction. This suggests that the richness of VR does not automatically translate into positive communication experiences, and other factors, such as technical reliability and user interface design, play a crucial role.

The findings also highlight the cognitive and emotional demands of VR communication. The need to process rich visual information and navigate the social dynamics of virtual environments can lead to cognitive effort, while the immersive nature of VR can trigger strong emotional responses. This aligns with MRT's notion that richer media can both enhance and complicate communication experiences, depending on the user's ability to manage the demands of the medium.

As for TAM, the excitement expressed by participants and their willingness to repeat the experience suggest a positive perception of VR communication's potential usefulness. However, the negative experiences related to group communication, limited engagement, and challenges in initiating conversations highlight areas where VR communication may fall short of user expectations. These negative experiences can negatively impact perceived usefulness and hinder the widespread adoption of VR communication.

The limited prior experience of most participants and the ambiguity of non-verbal cues in VR raise concerns about perceived ease of use. If VR communication is not perceived as intuitive and user-friendly, potential users may be hesitant to adopt it.

5.2 Conclusion

Within the sample for the study, the Gen Z answers to the interview questions produced an array of reactions and insights, including the positive and negative aspects that affect the communication experience and are indicative of the perceived ease of use and perceived usefulness both of which are fundamental and influential to the decision to use the technology (Davis, 1989).

These results are consistent with other literature regarding VR experience, Roberts et al., (2019) suggested in the study that perceived ease of use is increased when technology and communication experience is more user-friendly despite the difference in ages between the samples as the sample for the study consisted of Gen Z in contrast to older adults used in the researcher's literature.

The study also suggests that the positive response of participants in regard to other aspects of the experience indicates that the Gen Z find potential usefulness to this type of communication in the future.

These findings are important to Gen Z due to the fact that they could be considered netizens who currently account for the majority of social media users (Oguafor & Nevzat, 2023) which translates to the communication aspect of it which makes them the ideal age group to utilize this type of communication for within daily life in the future.

5.3 Future Research

The potential of Virtual Reality (VR) in communication and research is vast, with studies showcasing its effectiveness in various domains. Tussyadiah et al. (2018) showed how VR can affect users' attitudes and intentions, emphasizing how important presence is in VR experiences. This finding aligns well with the work of (Slater & Sánchez-Vives, 2016), who showed that the users behave similarly in VR as they would in real-life situations, also emphasizing the significance of presence in VR interactions. Furthermore, Maples-Keller et al. (2017) dived into the efficacy of VR-based exposure therapy, showing and indicating the practical applications of VR in the treatment of psychiatric disorders. Kim et al. (2018) also explored the impact of

presence on the user's enjoyment in VR tourism, highlighting how user experience is affected and influenced by the sense of presence in virtual environments.

The incorporation of User Experience (UX) with presence and Experimental Research can enhance the depth of future studies and research regarding virtual reality (VR) and communication in virtual reality (VR), Parsons (2015) stressed on how important the value of virtual environment-based assessments in giving insights into clinical, affective, and social processing, emphasizing the potential for detailed findings through the usage of experimental approaches. Furthermore, Hamilton et al. (2020) conducted a systematic literature review on immersive virtual reality (VR) in education, emphasizing the effectiveness of virtual reality (VR) in improving and enhancing learning outcomes, which could be a very valuable framework for future research and studies incorporating User Experience (UX) with presence. Lastly, Xie et al. (2021) discussed the benefits of virtual reality (VR) skill training applications, indicating improvements in collaborative performance through virtual reality (VR) training, which could be a very important aspect to consider in future research and studies focusing on specific populations like the older generation of potential users or individuals and users with disabilities.

To expand on that point, studying and researching the impact of virtual reality (VR) communication on specific populations, such as the elderly population or those with disabilities, matches with the research by (Baker et al., 2019), who investigated social virtual reality (VR) communication among older adults, emphasizing the role of avatars in helping and facilitating communication. Furthermore, Mehrabi et al. (2022) emphasized the potential of immersive virtual reality (VR) exergames in promoting the well-being of community-dwelling older adults, indicating that the challenges

related to system calibration and motion sickness are points that could be addressed in future research and studies focusing on specific populations. Moreover, Bryant et al. (2019) discussed the use of virtual reality (VR) in communication disability research, showing the potential of multi-user interfaces in virtual reality (VR) interventions for improving and enhancing communication in a social context, which could also be relevant and important for comparative studies between different user groups like the one below.

Comparative studies between Gen Z and the elder population to deduce unique advantages and or disadvantages in user communication in virtual reality (VR) could draw insights from studies like (Gao et al., 2020), who explored virtual reality (VR) exercise as a coping strategy for health promotion in older adults during the time of the COVID-19 pandemic. Furthermore, Vaezipour et al. (2021) looked at clinician acceptance of virtual reality (VR) technology in communication rehabilitation, which showed the importance of user experience and enjoyment in virtual reality (VR) systems, which could be a very valuable considerations in comparative studies between different user populations. Lastly, Brown (2019) examined virtual reality (VR) use among the older adult population, which provided insight on the usability aspects and focus group insights that could help direct future comparative research and studies on communication in virtual reality (VR) in diverse user groups.

Lastly this study recommends the use of the Experimental Research Design, Experimental Research Design in concept was defined by Aljarah (2021) as a systematic approach used to identify the relationship between cause and effect, it was also mentioned that it focused on getting a better understanding of customer experience and satisfaction as the methodology identifies the variables related to feelings. Other

studies found that the experimental research design methodology assists with developing situations to be used as an experiment to the subject of the study based on the factors of the subject of the study (Montoro Rios et al. 2006).

Taking this further, it can be concluded that the experimental research design approach can be applied in various settings, including laboratory studies, field trials, and natural experiments. An essential type of experimental research design is when used in laboratories as this certain setting involves an elevated level of controlled experimental environment that this often contributes to misrepresenting the experiment by the real customers (Aljarah, 2021).

Another method of conducting experimental research design is field experiments, a method that is the opposite of the laboratory experiment in terms of customer involvement and research environment. The limitations of experimental research design are when individuals do not have control over the independent variables. The findings from such experiments are often restricted due to the lack of control over external factors. However, Malodia et al. (2023) suggested that having an uncontrolled environment during the study contributes to the actual context in which the elements of the research are exclusive to a field experiment as compared to experimental research.

Experimental research design can be implemented in two distinct ways: the between-subject experiment design and the within-subject experiment design noting that in regards to the within-subjects design, it is argued that all members must participate regardless of the conditions whereas the between-subject design only allows one condition per member to be experienced (Bhandari, 2021).

To conclude, the integration of virtual reality (VR) technology in communication research and studies offers a rich ground for exploring user experiences, presence, and the impact of virtual reality (VR) on specific populations. By incorporating UX with presence and Experimental Research frameworks, future research and studies can delve deeper into the details of virtual reality (VR) communication and its implications and effects for diverse user groups, like the elderly population or individuals with disabilities. Comparative studies between different user populations and age groups can provide valuable insights into the unique advantages and challenges of virtual reality (VR) communication, paving the way for more targeted and inclusive research in this rich and evolving field.

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APPENDICES

Appendix A: Interview Questions

Interview questions draft:

1. Did you ever experience a strong sense of engagement during any of the conversations that you had with people in this VRchat session?

Probes:

What was the cause of this experience?

Why do you believe it did not have this experience?

In comparison to typical group conversations, how would you assess the level of engagement experienced in this context?

Can you provide an estimate of how much time did that experience last during the session you had in the virtual reality environment?

2. Did you have any expectations or specific goals in mind before starting the VR communication? What were the purposes of these goals?
3. Kindly describe the communication experience you had in this VRchat session.

Probes:

- a) Did you have any experience in communicating with people in VR prior to this session?
 - b) Did the virtual reality (VR) environment contain visually attractive elements, and if so, how were they presented?
 - c) Explain the steps you took to initiate your exploration of VR communication in this session.
4. Does your experience in this session make you more or less inclined to further pursue this type of communication in the future?
 5. Regarding this VR communication session, how focused were you?

Probes:

- a) How much were you aware of your physical surroundings during VR communication?
 - b) Were there any factors that diverted attention during the virtual reality exploration, and if so, what were these factors?
 - c) Evaluate the difficulty you encountered during the virtual reality communication session.
6. During this session, would you consider yourself, excited or averse to the idea of communication in VR?
7. Did participating in virtual reality (VR) communication require a significant amount of cognitive and emotional effort from you? In what manner would this be the case?
8. Reflect on whether the virtual reality (VR) environment consistently met your expectations. If it did not, please share any surprising aspects you encountered.
9. Did you experience a feeling of control when interacting and communicating within the (VR) environment? What are the reasons for or against it?
10. What factors influenced your decision to end your session and what were the reasons behind it?
11. What were your emotions at the end of the VR session? Were they positive or negative? For what reason?
12. What benefits did you observe from your virtual reality communication experience?

13. did you feel like you would like to go back to this virtual reality session or any particular virtual reality environment after it ended? What are the reasons for or against it?

(Influenced by What is user engagement? A conceptual framework for defining user engagement with technology - O'Brien & Toms, 2008)

Appendix B: Coding Relationship Table

QR	Codes	Defenetion	Meaning of the code	Text segment
Social Presence	1. Focus 2. spatial awareness 3. Virtual elements	The extent of social presence experienced from Communicating in VR	Identifying the factors that attracted participants to their VR communication experience, including how they perceived this experience and interpreted non-verbal cues.	"I was pretty focused because like the visuals and everything made me like concentrate on what I was doing and like I was concentrated on where I wanted to go and move around " "The characters and how they looked, they looked as if they were from a fictional game or an anime or a movie. very appealing to me because I watch these things."
Ease of Interaction	1. Distractions 2. Control 3. Effort	What are the factors that made the communication in VE easy or hard	Identifying the ease in which participants experienced communication and what factors affected it	"The only factor that diverted was the mic issue I was having so I kept on switching out and switching in" "no, not really. I felt like I was just like chatting with some normal people"
Communication experience	1. Emotions 2.Excitement 3. Experience 4. Engagement 5. Initiating Conversations 6.Willingness to repeat	How was the communication experience in VR for the participants	Identifying how the participants felt while they were communicating in VR and how they felt afterwards	"When I tried to enter a conversation between people, they were talking about a topic midway, so it was hard for me to actually get involved and when I try to speak kind of people are ignoring as if I'm disturbing the conversation ." " " Not really. The engagement was very minimal and not direct. It was very playful." "I went up to people and started chatting with them." " I would not like to repeat the same experience but I would definitely would love to try different things if it was more interactive."